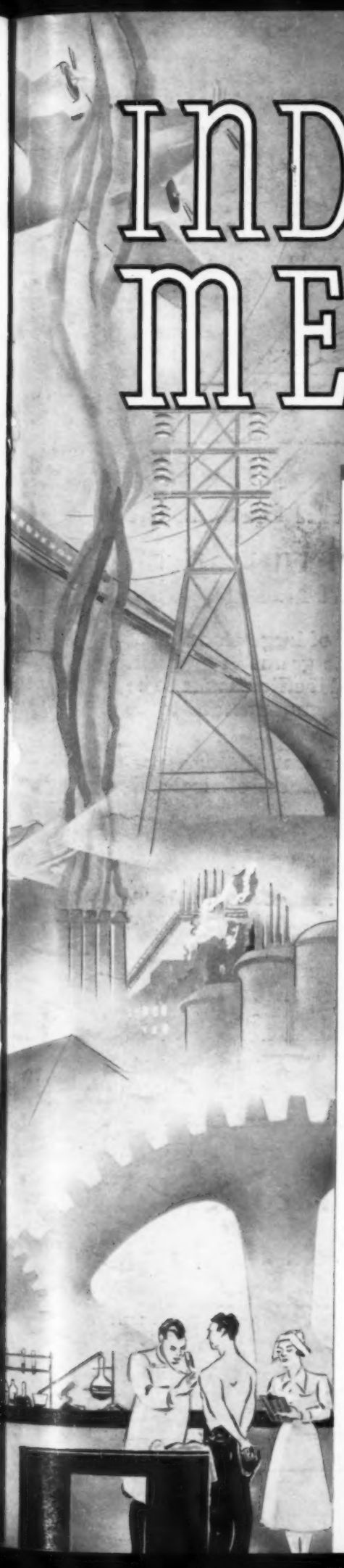

INDUSTRIAL MEDICINE

The Journal of Occupational Diseases and Traumatic Surgery

June, 1941

Control of Tuberculosis
— And the Employability of the Tuberculous —

Trauma and Disease
— Some Elements of Their Relationships —

Non-Occupational Injuries and Illnesses
— A Survey in a Major Carpet Mill for 1940 —

Physical Examinations
— Practical Results —

An Analysis of Toe Injuries
— In Relation to Accident Prevention —

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Volume 10 Number 6

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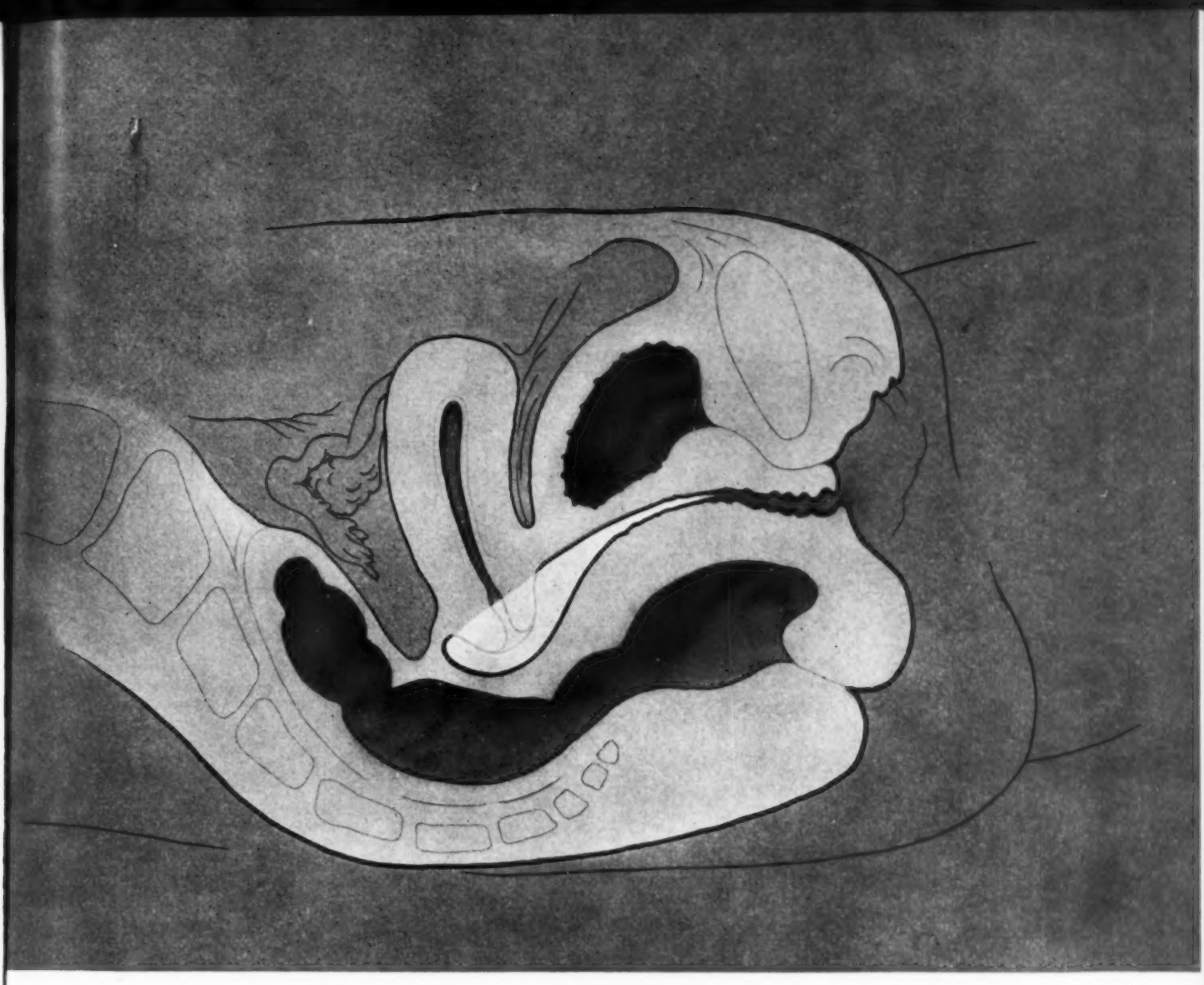

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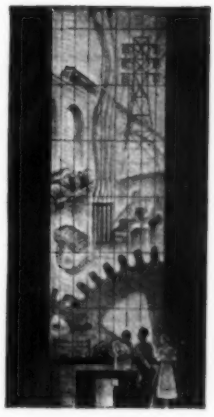

OCCUPATIONAL DISEASES
TRAUMATIC, INDUSTRIAL

INDUSTRIAL MEDICINE
& RAILROAD SURGERY

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INDUSTRIAL HEALTH and DISEASE:
INDUSTRIAL HYGIENE.....MILTON H. KRONENBERG, M.D. 270
—in a Public Health Program
(In "Illinois Medical Journal")

DR. SAWYER'S "Control of Tuberculosis" (page 221), reporting on the detection and control of tuberculosis among the employees of Eastman Kodak Company, describes one of the very finest expressions of industrial medicine in a superlative aspect. Significant, indeed, is the reduction of incidence from 2.3 per 1,000 in 1921, to 0.2 per 1,000 in 1940, as compared with the average reduction to a point in 1940 where the *death rate* for the total population was more than twice the *incidence* in the Eastman group, while, in general, as DR. LYNCH says (on page 229) "the death rates from tuberculosis, age period for age period, are from two and a half to nearly four times as high among industrial workers as among professional, mercantile, and agricultural groups." This, however, is only one of the many significances which DR. SAWYER so ably and authoritatively sets forth. The article as a whole is one of those which are destined to be very often referred to. . . .

DR. LYNCH'S "Address" as President of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS (page 226) is a real masterpiece of thought, composition, and expression. It seems particularly impressive in several respects. For one thing, it emphasizes, gently but unmistakably, the broad scope of the field of necessary usefulness of the industrial physician; for another it constantly reminds that the usefulness of the industrial physician is now more necessary than ever—

—Continued on Page 6

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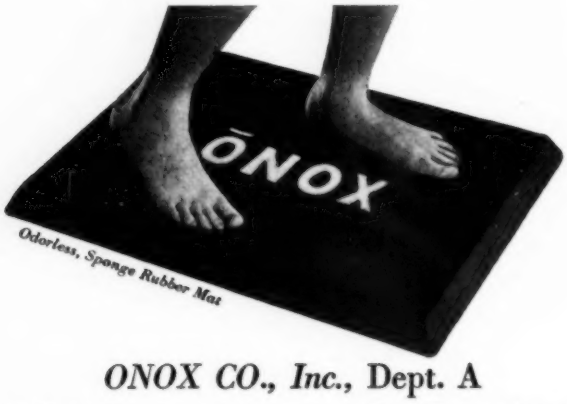

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—Continued from Page 3

since the emergency requirements insist not only that more men work but also that they keep at work more steadily. With aggregate employment officially announced as back to where it was years ago, in excess of 50 million, and the average loss of time from illness (see the Editorial, page 267) at eight days per worker per year, the total wastage, as DR. LYNCH so well suggests, is appalling. To the industrial physicians he says: "I believe we can help." Knowing his audience, and fully aware that in all the world there are none who, in this respect, can help more, DR. LYNCH must be credited with a Lincoln-like appreciation of the mighty eloquence of quiet understatement. . . .

DR. KAMMER's "Practical Results of Physical Examinations" (page 230) abounds in values which seem much more modestly described than their importance merits. Expressive is the statement, with reference to 243 individuals who, in the first 15,000 examined, were found to have major physical defects that, as to the problems of placement which they presented, "most of these have been solved to the satisfaction of the employee, his superiors, safety officers, and the clinic staff. Once a job is agreed on in these cases, no change can be made without permission of a responsible person in the medical de-

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partment." . . .

DR. COLWELL's "Trauma and Disease" (page 233) covers a subject in which the problems, as he says, "deserve the attention of the best minds in medicine." The studious quality of the article suggests two comments: (1) that no reader would begrudge the insertion of "other" ahead of "best minds" in the foregoing quotation; and (2) that in this relation, perhaps more than any other, it is well to suggest: "Physician, *know* thy patient.". . . .

DR. NASATIR's "The Los Angeles Industrial Health Program" (page 236) is one of the papers read at the First Annual Meeting of the WESTERN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, at Del Monte, California, May 4, 1941. The other presentations at that meeting will appear in early issues of INDUSTRIAL MEDICINE. The article well describes an able and efficient service, which has its counterpart in an increasing number of localities. Among the numerous benefits of such services, they are making the smaller employers more "industrial-medicine conscious." DR. NASATIR's concluding paragraph, regarding the fact of cooperation between State and City Industrial Hygiene units, suggests the twin fact—so well established that is goes without comment—of the fine cooperation which is matter of course between the industrial medical and the industrial hygiene professions. . . .

DR. OVERTON's "Primary Cure of Traumatic Wounds" (page 239),

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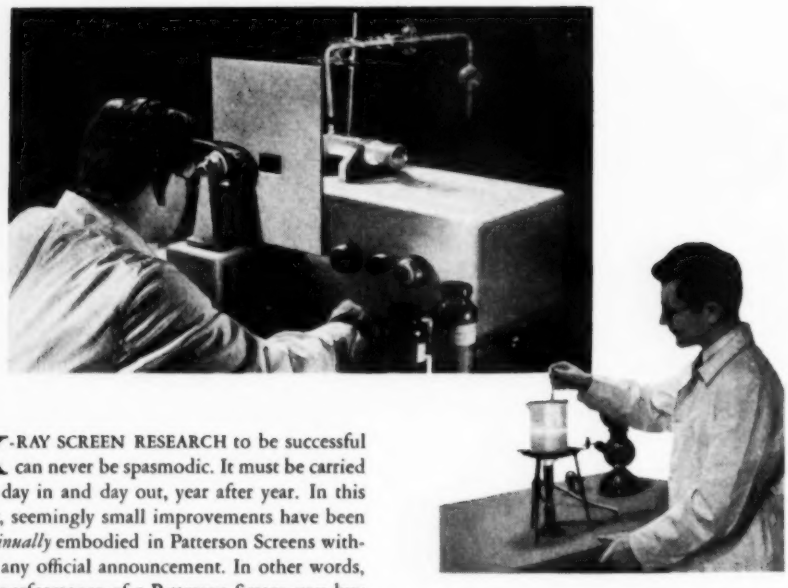

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from the Twenty-Second Annual Meeting of the CENTRAL STATES SOCIETY, stresses the importance of early treatment: "We wish to show that the only successful treatment is early treatment." From his basis of 247 consecutive cases so treated, in which the incidence of infection was only 0.34%, he shows it. . . .

DR. DIGNAM'S "Survey of Non-Occupational Injuries and Illnesses in a Major Carpet Mill for 1940" (page 242) is an illuminating addition to the growing volume of data all pointing the same way. Seldom, however, is the material of such an article more carefully studied or more painstakingly presented. . . .

DR. FAY'S "Evaluation of Compensation Injuries" (page 244) is another of the CENTRAL STATES' papers, and is a forceful reminder that the physicians in compensation cases represent primarily "the medical profession." Keeping that in the forefront of all reckoning, every one concerned will get a square deal. . . .

DR. VACCARO'S "Chromium Poisoning" (page 246) treats of one of the hazards which, under the impetus of the development of the war industries, may, indeed, "assume enormous proportions." . . .

DRS. FRIEDLAND and FARBER, with their "Primary Thrombosis of the Axillary Vein" (page 247) add one more to the case reports which are so valuable in the study of the rather uncommon eventualities of occupational incidents. The report is exceeding well done. . . .

DR. LIEBER'S "Analysis of Toe Injuries in Relation to Accident Prevention" (page 249) describes an antithesis of the preceding article in that it treats of an occurrence already very common, and, no

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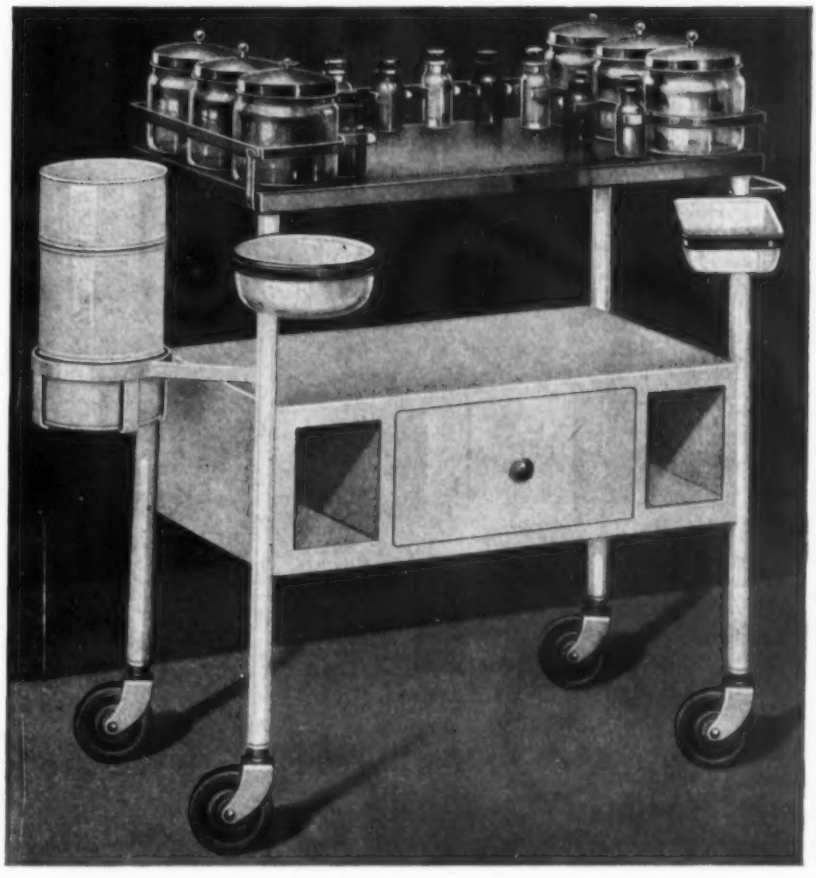

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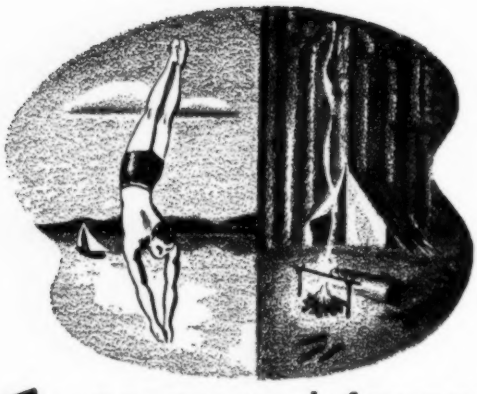
doubt, destined to become much more so in "this post-haste and romage of the land." This is another survey worked out in meticulous detail. Such are the stuff of which prevention is made. Some of the recognition DR. LIEBER's interest deserves has come in the fact that this report, on special request of the head of his Department, is having concurrent publication in the U. S. Navy's *Medical Bulletin*. . . .

DRS. SAWYER and GREZE present a study of "Electrolytic Sodium Hypochlorite" (page 252). The series in which they used it, at the Methodist Hospital in Brooklyn, comprised 459 minor and 47 major traumatic injuries, and the results, carefully tabulated, sustain their conclusions as to its value. . . .

DRS. EMERSON and BRANDON submit the results of "A Physical Fitness Service" (page 254) offered to Aetna Life policyholders and availed of by 350 of them. The same service as previously afforded the executives and employees was described in INDUSTRIAL MEDICINE for January, 1935. The authors conclude: "We believe that the physi-



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cal fitness service here described is capable of increasing life expectancy to some extent in practically all cases." Their evidence, accumulated since January, 1935, points to the correctness of their belief. . . .

DR. SAPPINGTON summarizes (page 257) the proceedings of the Twenty-Second Annual Meeting of the CENTRAL STATES SOCIETY. . . .

And DR. HAYHURST rounds out the text of what we think is an unusually interesting issue with his digest of the famous old tract of SIR GEORGE BAKER, BART., M.D., etc., entitled "An Inquiry Concerning the Cause of the Endemial Colic of Devonshire," this being the first one of his Medical Tracts which he read at the College of Physicians, in London, between 1767 and 1785. Accompanying the manuscript, DR. HAYHURST says: "Editors are interested in the breadth of appeal which their publications may have. In glancing through the enclosed I find all of the following, which I have jotted down without regard to rote, rule or reason: The epicurian and the jockey, the glutton and the abstainer, the rich and the poor, the master and the servant, the chlorotic girl and the valetudinarian, the innkeeper and the beverage maker, the orchardist and the vineyardist, the compounder and the user of recipes, the foodmaker and the food preserver, the climatologist and the sailor, the radical groups from the North American Colonies and the

—*Continued on Page 274*

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Review by

C. O. SAPPINGTON, M.D., DR.P.H.

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As the author has stated in the preface to the first edition in 1934: "Particular emphasis is placed on the necessity for careful medical investigation in order to determine liability. Miscarriage of justice occurs unless this problem is clearly considered by the attorney for the plaintiff as well as for the defendant. Doctors called into the case by either side, and serving to advise them, or to explain the matter to the court, must likewise consider the entire subject from a legal viewpoint. This may be new to them. Their medical texts will be of little value.

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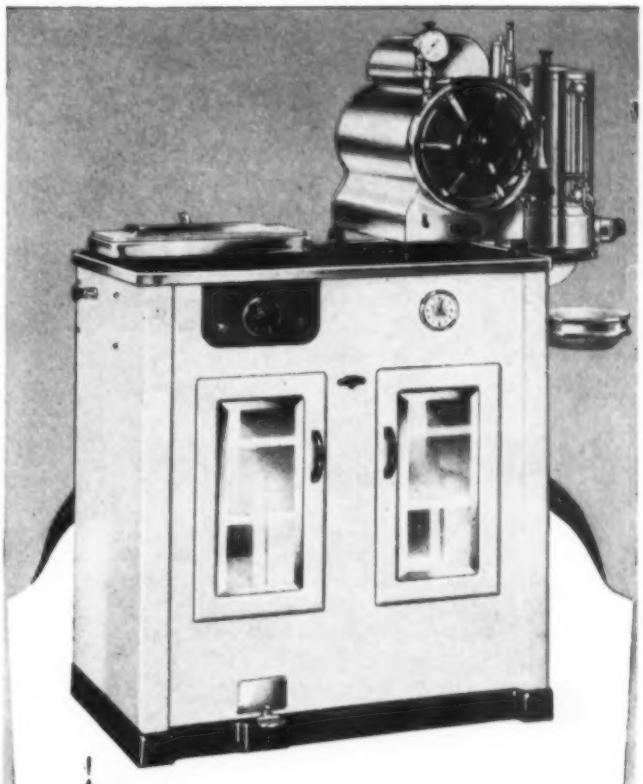

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Among the special features of the book is a condensed table of contents, an expanded table of contents, a table of contents at the head of each chapter, special questions in each chapter covering the various phases of investigation of claims, a bibliography at the end of each chapter, and tables of disability on approximately 70,000 cases, including temporary disability, compensation costs, and medical costs.

The index has been especially carefully prepared and covers 220 pages. There is also included with the book an atlas of human anatomy, with explanatory text by Dr. J. F. Williams, of Columbia University, including excellent colored reproductions of various systems and portions of the body.

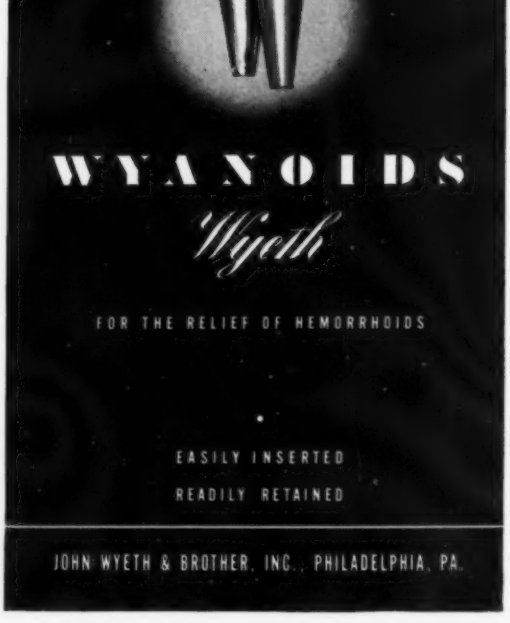
The volume is by Dr. Roscoe Gray, 1486 pages, with the use of sections at frequent intervals for easy reading. The first edition was printed in 1934 and this second edition has been printed in 1940, by Matthew Bender & Co., Albany, N. Y., and is priced at $16.50.

ASSOCIATIONS

Amendment to the Constitution

—A. A. I. P. & S.—

THE following amendment to the Constitution was presented at the Annual Meeting of the Board of Directors of the American Association of Industrial Physicians and Surgeons, Monday, May 5, 1941, in Pittsburgh, Pennsylvania.



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ARTICLE III, SECTION 1: In line four after the words 'Only physicians' strike out all the words following up to and including the words 'Active Membership' in lines nine and ten, and insert the following: 'whose industrial medical work comprises at least fifty per cent of their time or whose major interest lies demonstrably in industrial medicine and surgery;'—

The amendments to the Constitution and By-Laws creating the offices of a Managing Director and a Treasurer and also appointing a Finance Committee were adopted by the Board of Directors and their action was ratified by the membership at the Annual Meeting. Those amendments pertaining to the creation of a House of Delegates were not adopted.

—VOLNEY S. CHENEY, M.D., Secretary-Treasurer.

The new Officers and Directors of A.A.I.P.&S. are listed on page 4. The new Officers and Directors of the American Industrial Hygiene Association will be included in the next (July) issue. The Annual Meetings of both Associations will be held in 1942 at Cincinnati, Ohio.

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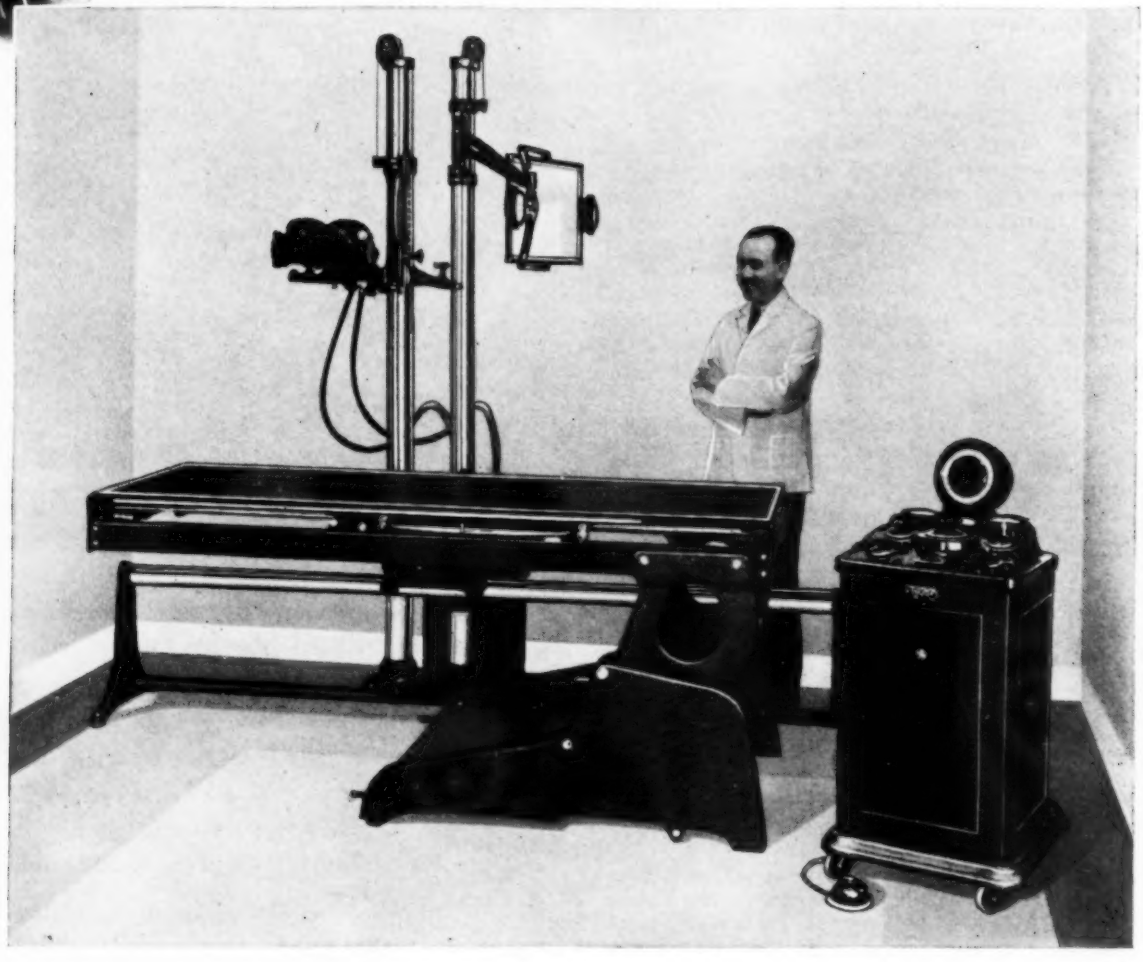

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Industrial Medicine

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The Science, the Law and the Economics of Industrial Health

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Control of Tuberculosis

—*And the Employment of a Tuberculous Individual in Industry*—

WILLIAM A. SAWYER, M.D.,
Medical Director, Eastman Kodak Company, Rochester, New York

HEALTH supervision programs in industry should be so set up that symptoms or signs of disease may be discovered as early as possible. Medical advice should be easily available to every employee. It should be a company-wide policy that if anything is thought to be wrong with a worker, he is urged to go to the medical department at once.

This is a safety first measure.

At the Eastman Kodak Company applicants for employment are examined before they are hired and periodically thereafter if any defects are discovered, if symptoms appear subsequent to their examination or if there is any exposure to hazardous employment. One important phase of this program has been the detection and control of tuberculosis. Finding tuberculosis is largely a question of looking for it. Group inventories or surveys offer the quickest way to bring tuberculosis out into the open so that it may be treated and controlled. Waiting for its discovery among those who, because of symptoms, consult private practitioners or go to hospital out-patient departments, is extremely inefficient.

To demonstrate what can be done, I would like to review briefly our experience in the Eastman Kodak Company. In 1921 the first roentgenological survey, made of 3,280 apparently well adult employees, showed 2.3% to be positive for clinical tuberculosis. Because this survey roentgenologically, revealed cases of previously unsuspected tuberculosis, in which there were no clinical symptoms and no diagnostic signs (rales), the efficiency of the stethoscope in detecting tuberculosis, particularly in its early stages, was seriously questioned, by us, for the first time. It seemed evident that if clinical history and the development of symptoms are depended upon to initiate roentgenological examination of the chest, many cases of early tuberculosis may progress to an advanced stage before discovery. Consequently, in 1928, routine serial or annual stereoroentgenograms of the chests of apparently well adults were made an established procedure for the detection of early relapse.

For the group covered in this report, everyone is now roentgenologically checked every three years, and many oftener.

In addition to the routine roentgenograms, our nurses are constantly on the watch for cases of tuberculosis among those they see either in the plant or in their homes. If there is any question of the possibility of such infection, the employee is urged to have a chest roentgenogram. In this way, we occasionally discover an early lesion, or a "flare-up," between regular routine check-ups.

Last year, 1940, our medical and nursing staff had 200,329 contacts with 18,504 employees. These numerous visits offer a rare opportunity for detecting incipient disease.

The present phase of our program for attempting the early detection and control of tuberculosis among employees has demonstrated that it is possible to discover exceedingly early tuberculosis lesions of a progressive type and to observe accurately their behavior even in the absence of physical signs and clinical symptoms. It makes available a series of consecutive stereoroentgenograms of the chests of apparently healthy adults, which are invaluable in studying slight changes taking place from time to time.

Presented at the Twenty-Sixth Annual Meeting of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS, Pittsburgh, May 7, 1941.

It should be mentioned here that while we consider 14 in. x 17 in. films the most satisfactory and trustworthy method of detecting early and symptom-free tuberculosis, there are other very successful and almost as efficient methods. The 4 in. x 5 in. film and the 35-mm. films and the 14 in. x 17 in. paper are all being used for mass surveys. While not as accurate and dependable in all respects, they help greatly in uncovering unsuspected chest pathology. From information thus far available it appears that the 4 in. x 5 in. film ranks next to the 14 in. x 17 in. Following in order of reliability is the 14 in. x 17 in. paper, the 35-mm. film and the fluorocope. The errors of these latter methods as compared with 14 in. x 17 in. films run from 1% to 5%. The tuberculin test is one way of approaching this problem of looking for tuberculosis providing all positive reactors are x-rayed.

Tuberculin tests have not been done by us because they are not sufficiently specific in indicating clinically significant tuberculosis.

Where clinically significant or possible active disease is discovered, the employee is referred to his family physician or to a clinic, with a complete medical summary of the findings and specific recommendations. In every instance the necessity for examining the household contacts of the patient is stressed.

Adequate records are kept, and to insure the return of employees on the dates recommended for the follow-up examinations and roentgenograms, a tickler file is maintained and is the sole responsibility of one assistant. This has been very effective as a reminder to send for individuals on schedule.

It is vitally important for the successful conduct of an investigation of this kind.

Any studies concerning tuberculosis, by the very nature of the infection, must of necessity continue over a long period of years and embrace reasonably controllable groups of individuals. Proper and efficient methods to insure continued medical supervision are essential. In the past, our failure to establish early diagnosis and to prevent serious relapses among employees has been due, in many instances, to clerical error or oversight which resulted in the neglect or breaking of scheduled appointments by individuals. In our early days we passively allowed employees to assume the responsibility for their own scheduled return for examination. We believe an accurate and active follow-up technique is a basic requirement for the success of any serious effort to curb tuberculosis. It requires vital bookkeeping to guarantee to the individual adequate medical supervision, both for the early detection of such tuberculosis as he may develop and for the control of his arrested disease after he has resumed his work. General appreciation and thoughtful application of this type of supervision for the tuberculous individual commonly encountered in private, clinic and industrial practice will be a great step forward in preventive efforts.

You will doubtless be interested in the amount of tuberculosis in a part of our employee group. In analyzing a group of 4,665 employees, the incidence of clinically significant tuberculosis was found to be 0.5%, whereas in 1921, at the time of the original survey, the incidence was 2.3%. A comparison of the above mentioned employee group of 4,665 with a group of 4,640 applicants for employment showed the incidence to be the same —0.5%. Detailed statistics of this study can be found in the report "Tuberculosis Control in Industry."* In 1940, the incidence was 0.2%. This is a significant reduction over a period of almost 20 years, and perhaps close to an irreducible minimum. It can be accomplished in any employed group, if a definite program is outlined and followed.

In cases where applicants have to be rejected because of tuberculosis, their condition is explained to them, and they are urged to put themselves under adequate medical supervision. A complete report of the examination and roentgenological findings is sent to the family doctor, if requested. Individuals having no family doctor are urged to select one or go to a clinic. By such procedure, we feel we are not only reducing tuberculosis in industry, but also aiding in its control in the community.

Everyone has become more economically-minded in the past few years, and there is closer scrutiny of medical costs than ever before. The measuring of the cost of a disease is perhaps the only way some individuals will ever visualize its importance.

In an effort to "drive home" the huge sum of money being spent for the treatment and cure of tuberculosis, we used the accounting method in a study in 1936.

The important findings in our study of 100 cases are as follows:

A. The average time loss per case from work due to tuberculosis, was 595 working days, or two years and 15 weeks.

B. The total cost involved in caring for these 100 cases was $406,162, making the average cost per case $4,062.

C. Private agencies bore 79.8% of the costs incurred, of which the family bore 63.2% ($256,690). Public agencies (tax-supported) bore 20.2%.

D. The average age of the group was 31.3 years for the 49 women and 51 men concerned.

The reduction of the death rate from 224.6 per 100,000 in 1911 to 44.3 per 100,000 in 1940 naturally has had a tendency to lessen our ardor in our pursuit of the bacillus. However, in spite of such great gains, it is well to remind ourselves occasionally that tuberculosis still ranks seventh among all causes of death in the United States and is the chief cause of death in early adult life. We are interested in tuberculosis because we want to assist in its eradication. We have been convinced for some time that this can be done, but only when we think sufficiently in terms of its huge cost. The emotional appeal has been largely ex-

* Published in Vol. 39—Nos. 3 and 4 (1939) of *The American Review of Tuberculosis.*

hausted. The financial approach may be our best weapon.

Tuberculosis is a protracted disease. It recurs frequently and hits in the most productive years. With the possible exception of some cases of chronic bronchitis, emphysema, insanity, arthritis, and a few rare diseases of the central nervous system, it is the most handicapping and disabling of all diseases.

Unfortunately, there are no figures available to bear out this statement.

Employment of a Tuberculous Individual

REHABILITATION of the tuberculous is another very important phase of tuberculosis control, quite as vital as the discovery of the disease. We all know that recovery merely means the arrest of active disease. It does not mean cure. It is very much like the definition of armistice; a cessation of hostilities agreed upon by opposing forces; that is, a truce. How enduring this truce with tuberculosis is, depends on the closest cooperation and understanding between physician and the recovered patient. Lack of such prolonged medical supervision over a period of years has resulted too often in a recurrence of active disease.

But this need not remain true where an aggressive attitude in the management of so-called "ex-patients" and their contacts is assumed, remembering always that the family is the unit in any program for the control of tuberculosis.

Rehabilitation consists of a continuing adequate medical supervision and an opportunity to engage in suitable work. Training of course is sometimes required.

In all effort to understand this problem, a brief review of what has been recorded by others may be helpful.

In the period between 1904-1907, when Dr. Vincent Y. Bowditch was serving on the staff of the Rutland (Mass.) State Sanatorium, it was recognized "that the 'after-care' of patients was the weakest link of that ideal chain which, collectively welded, should insure and provide the best conditions to the individual physically, economically, and socially during the time he was under the influence of the tubercle bacillus. It was beginning to dawn on the observant mind that complete rehabilitation was a dual problem, medical and socio-economical."[1]

In 1913 the Altro Work Shops were started in an effort to reduce the tremendous percentage of relapses after treatment.[1] In 1914 a similar experiment, The Papworth Colony, was started by Sir Pendille Varrier-Jones in England.[2]

Since that time numerous experiments have been carried out and are summarized in a monograph entitled "Sheltered Employment for the Tuberculous in the United States,"[1] published in 1927 by Dr. Pattison and Dr. Jacobs. They concluded that "The real problem of after-care involves a frank recognition of the fact that here is a group of men and women who cannot be treated as normal workers. They must be considered as physically substandard and their work must be adjusted to their physical capacity to do it. How shall this be accomplished? If it cannot be done in ordinary industry, is the sheltered workshop or agricultural or industrial colony a solution of the problem?"

This certainly is not the solution for all cases. There probably is no one answer. As pointed out by Minkoff and Hirsh,[7] occupational therapy and rehabilitation have to be adapted to meet individual needs. For some, sheltered employment is the only thing; for others, a change to different work with some training provided. And then there are those who can return to their former employment without any untoward risk. Under no circumstances, however, can any of this be accomplished without adequate, regular, and periodic medical follow-up. By this is meant, some physician watching these cases who not only understands the vagaries of tuberculosis but is sufficiently conversant with the requirements of jobs in industry.

In 1928 a study, "Employment of the Tuberculous," was made by Alice C. Klein and Grant Thorburn.[3]

Their conclusions indicated that:

1. "A medically supervised vocational and employment service for tuberculous ex-patients will aid in carrying through a recovery already started and will help reduce the relapse rate (out of 676, 17% relapsed).

2. "For the large majority of patients who are unable to return immediately to full-time work some special provision in part-time shops should be made.

3. "Industrial training in skilled trades for the tuberculous has not proved possible from the vocational point of view for psychological and economic reasons."

Even where state employment services, as in New York, interest themselves in an attempt to rehabilitate ex-tuberculous individuals, any plant hiring such workers is not without responsibility. Individuals who have had tuberculosis and have recovered should be given every chance as to employment. It is an individual case consideration. Hence the importance and necessity of following these cases to prevent relapses.

The Metropolitan Life Insurance Company has, over a period of years, been following arrested cases of tuberculosis after their return to work. Following is a summary of their experience.

"Unfortunately, pulmonary tuberculosis is a disease with a marked tendency to relapse; therefore, we maintain a very vigilant supervision of our arrested cases after their return to work so that we may detect any reactivation of the disease at the earliest possible moment. . . . As with the initial detection of the tuberculosis, we have found that the appearance of symptoms is very unreliable as an early indication of relapse. At present we depend upon laboratory procedures, chiefly the roentgenogram, repeated at frequent intervals. Special consideration is given these employees in respect to rest periods, longer convalescence following infections, especially respira-

tory, etc. Several have spent a four-week period at the Sanatorium for further check-up and additional rest. With this careful supervision which is maintained for at least five years following return to work, very few of our relapses have had a spread of their disease to any considerable degree before the reactivation was recognized."[4]

"Most remarkable are the long-term results with those patients who exemplified both early detection and adequate training. Of this group consisting of those with minimal tuberculosis on admission who were discharged in satisfactory condition, over 80% were at work or able to work five years after discharge, only 10% were unable to work and 3.5% had died. The mortality of this large group of people was only sightly higher than normal. These figures are in marked contrast to those with far advanced tuberculosis who were in unsatisfactory condition at discharge. Of this group, less than one-fourth were able to work on the fifth anniversary of their discharge, about one-half had died and most of the others were ill or unable to work."[5]

An article by Edward Hochhauser entitled "Industry's Practice in the Employment of Ex-Patients"[6] indicates that whether or not an ex-tuberculous patient gets his job back depends "not upon the type of industry or even its size, but upon the attitude, the intelligence and the experience" of the employer. One railway company fires an employee as soon as a diagnosis of tuberculosis is made and will not re-employ him. Another provides hospital care and assures him of a job when he is able to return to work.

Mr. Hochhauser points out the danger of employees continuing to work because they fear loss of their job if the disease is discovered. He says that "one of our mid-western states found a number of advanced, open cases of tuberculosis working in the assembling department of one such industry even though sanatorium treatment had been recommended and the state was ready to provide adequate treatment. On inquiry it developed that if the management learned that an employee had tuberculosis he was fired and it was known that he would never be re-employed. As the employer had no program of medical examination, he did not know of the presence of tuberculosis."[6]

This is a point which must be kept in mind. If an industry makes it a practice to employ arrested cases of tuberculosis, it should be made known to the employees that such is the case. It is a potent generator of good will for workers to know that, should they contract this disease, they will be given every consideration and if at all possible, taken back to work. It has ben found that workers not uncommonly will refrain from seeking medical diagnosis for fear of losing their jobs. As Surgeon-General Parran has made us realize about syphilis, we will not find all the hidden cases until complete confidence is developed by such a policy.

A survey of 219 industrial organizations revealed the fact that 203 employers with over 1,600,000 employees do re-employ workers with arrested tuberculosis "under schemes that run from indifference to complete medical and industrial supervision, while some of these employers with over 630,000 workers provide part-time work for patients who, on leaving the hospital or sanatorium, are not able to work a full day."[6]

In reporting on lost time, 87 stated that "in attendance the re-employed tuberculous compared favorably or were better, five reported they were less favorable, and five stated that their loss of time was slightly higher."[6]

Unquestionably, there has been a prejudice against hiring individuals with arrested tuberculosis. The two outstanding reasons for this have doubtless been (a) the knowledge that the possibility of relapse is great with consequent loss of time and (b) the prejudice of the public against employing the tuberculous and expecting other individuals to work with them.

In an effort to study the absence record on account of sickness of those 250 employees in our employ, diagnosed as inactive tuberculosis, the figures available seemed to indicate that inactive cases as a whole lost more time than the average employee. By separating these inactive cases into three groups, we find that those who never cured to our knowledge lost approximately the same amount of time as the average employee; those who cured for minimal tuberculosis lost more time than those who never cured; those who cured for advanced tuberculosis lost more time than those who cured for minimal tuberculosis.

The figures of the Metropolitan Life Insurance Company indicate, as do ours, that the possibility of relapse is greatly reduced if the tuberculosis is discovered early, that is, in the minimal stage. In fact, it has been our observation that such individuals usually take better care of themselves than the average employee. We have one employee who has been arrested since 1930 who comes to our plant Medical Department every noon to rest. She seldom misses a day and her only absence since 1930 has been for an appendectomy. Arrangements are often made for such a mid-day rest.

When an arrested patient is able to return to work in our organization, it is customary to have him take up work on a part-time schedule, starting with a few hours a day and increasing gradually until his endurance permits him to work full time. Whenever possible the employee returns to his former employment. Such employees are followed closely after their return to work by periodic x-rays. Every effort is made to make sure they follow a satisfactory program.

A study of 100 cases of tuberculosis in 1936 (51 men and 49 women) showed 61% returned to work and 39% were not able to return. Of these, 82% returned to the same work and 18% changed to other jobs.

A subsequent analysis in 1939 of the course of 75 cases of tuberculosis after curing and returning to work showed that 16% of the minimal cases relapsed in from one to five or more years. Over

the same period, 52% of advanced cases relapsed. This verifies the concept that the earlier the diagnosis, the better the prognosis. It is certainly an argument in favor of better rehabilitation through early discovery.

Rehabilitation of the worker by putting him to work after his recovery must be accomplished if the gains of detection and treatment are to be maintained. Naturally certain factors involved must be carefully considered in the employment of the arrested case of tuberculosis:

(1) The extent of the lesion;
(2) The completeness of the cure;
(3) The character of the job;
(4) The necessity for adequate periodic medical follow-up, after return to work.

If these things are kept in mind and the individual involved is willing to cooperate fully, then the employment of an arrested case of minimal tuberculosis in the proper job, with medical supervision, is not too great a risk for any industry to take.

An additional phase of this problem of employability is the fear on the part of the employer that he may be held responsible under the Workmen's Compensation Law if the worker has a relapse. I understand that in some states this has happened, especially where there is an all-inclusive occupational disease amendment. At all events it is one reason why some employers refuse to employ workers who have had tuberculosis. To be sure they very often throw the responsibility upon the insurance carrier, which Hochhauser points out is not always justified. He says, "We frequently hear that industry would be willing to re-employ their tuberculous employees when able to work if it were not for the attitude of insurance carriers.

"'As far as I know no insurance company has expressed any attitude either for or against re-employment of arrested cases of tuberculosis' wrote one company which has been re-employing their own tuberculous workers over a period of 20 years with an excellent program of medical care and supervision."[6]

In last year's report of the National Tuberculosis Association, the following comments were made on rehabilitation:

"Determining which job offers the most practical and permanent adjustment for the healed patient depends on the health outlook, past education and experience, attitude, individual capacity, ambition and personality. The puddler in a steel plant may have the material for making a mechanical draftsman. The former stevedore may qualify to produce commercial lettering. Skilled office work may replace busy department store sales duties for the young woman on the road back.

"Industries have kept pace with others interested in rehabilitation. While avoiding publicity for reasons of their own, outstanding organizations in many fields, including heavy industry, have tested the possibilities of re-employing tuberculous workers who return to them with their disease successfully arrested.

"They have demonstrated such techniques as utilizing past familiarity with a trade or business. But they transfer the worker to new and more suitable tasks and give needed suplemental training within the industry."[8]

Industry has not only a responsibility in discovering tuberculosis, it has a responsibility in rehabilitation. If the tuberculous employee is automatically ruled out, a serious problem has been created. Discovering and arresting tuberculosis is only really successful if we make it possible for the individual once again to become a wage earner.

Summary

INDUSTRIAL medicine is primarily directed toward the discovery of incipient disease.

2. An example of this is the detection and control of tuberculosis amongst the employees of the Eastman Kodak Company where the incidence has been reduced since 1921 from 2.3 per 1,000 to 0.2 per 1,000 in 1940.

3. A program of routine serial or annual stereoreotngenograms was made an established procedure in 1928.

4. An accurate and active follow-up technique is a basic requirement for the success of any effort to curb tuberculosis.

5. In a study of the cost of tuberculosis among 100 of these employees, average age 31 years, the average time lost from work per case was 595 working days or two years and 15 weeks. The total cost for these 100 cases was $406,162 or an average per case cost of $4,062. Private agencies bore approximately 80% of the cost, while public agencies (tax-supported) bore approximately 20%.

6. Rehabilitation of the worker after convalescence must be considered if the gains of treatment are to be maintained.

7. A survey of 219 industrial organizations by E. A. Hochhauser revealed the fact that 203 employers re-employed workers with arrested tuberculosis.

8. The following factors must be taken into account in any consideration of the employment of an arrested case of tuberculosis:

(a) The extent of the lesion;
(b) The completeness of the cure;
(c) The character of the job;
(d) The necessity for adequate medical supervision after return to work.

9. It would seem safe to say that the employing of an arrested case of minimal tuberculosis on the proper job is not too great a risk, provided such individuals are under adequate medical supervision.

10. Discovering and arresting tuberculosis is only successful if we make it possible for the individual to once again become a wage earner.

Bibliography:

1. PATTISON, H. A., M.D., and JACOBS, PHILIP P., Ph.D.: National Tuberculosis Association, 1927.

2. KORNFELD, MURRAY: Disease of the Chest, 2:20., 1936.
3. KLEIN, ALICE CAMPBELL, and THORBURN, GRANT, M.D.: N. Y. Tuberculosis and Health Association, 1928.
4. REID, ADA CHREE: *Journal of Industrial Hygiene and Toxicology*, Vol. 23, No. 1, pp. 35-44, January, 1941.
5. Statistical Bulletin, Metropolitan Life Insurance Co., Vol. 20, No. 9, September, 1939.
6. HOCHHAUSER, EDWARD: *American Review of Tuberculosis*, 40:427-34, 1939.
7. MINKOFF, SAUL N., and HIRSH, JOSEPH: *Occupational Therapy*, Vol. 18, pp. 353-64, 1939.
8. National Tuberculosis Association: Report of the Executive Office, 1940.

Presidential Address

—American Association of Industrial Physicians and Surgeons Annual Meeting, May 6, 1941, Pittsburgh, Pennsylvania—

DANIEL L. LYNCH, M.D., F.A.C.S.

WHEN we were gathered together about a year ago to commemorate our twenty-fifth anniversary, my predecessor in office, DR. MCIVER WOODY, reminded us that this Society was meeting then, as it had the year of its birth, "in the shadow of a great war." Today, we all realize with grave concern that the shadow has become substance, that our beloved country is actually at war in all but the strict military significance of the word.

During the past 10 months it has been engaged in rearmament, fortifying itself to defend and preserve the sacred liberties and the priceless freedom by sacrifice won for us by the founders of this great nation, cherished legacies which we must, in honor, bequeath to our children inviolate.

At the beginning, and even today, the duty of adequately rearming appeared prodigious. To it there has since been added the enormous task of making this country "the arsenal of democracy." And yet, because of the spirit that has made America greatest among the nations of the world, because of the comparatively untapped wealth of our resources, and because of the supreme productive power of our industries, our country is meeting that test; it will continue to survive every challenge. It cannot be defeated from without, it must not be embarrassed from within.

It is the men and women of America who personify the spirit of which I speak—the same men and women who mine and mould our material resources into goods and wealth, who are the brain and blood and sinews of our industrial frame. Without them, all these things would be void and meaningless; spirit, resources and industry should then always be defined in terms of the men and women who make them real.

There is no question of America's spirit, little to concern us about our resources, for what we cannot find freely in nature, we make of the things she provides.

Industry—the men and women of industry—are the concern of this gathering, just as they were the concern of that handful of pioneers who formed this Association at Detroit in 1916: DRS. CROWDER, GEIER, HARVEY, PENBERTHY, SAWYER, SELBY, SHOUDY, WATSON, and others. These men knew that "of all the tools used in modern industry, the human tools are the most important," and with their contemporaries, bent their energies to make a nation conscious of that truth. It was no easy task, it must not die a-growing.

In those early days, the way of the industrial physician was looked upon somewhat as the way of the transgressor—a primrose path, a fee on every petal. Those within the forward ranks were not infrequently embarrassed by their professional brothers, and made to feel their sting. Only the pioneers fully appreciate that it was a hard and flinty road they had chosen to follow, uphill all the way. Only the deep-seated realization that the way was worthwhile, carried them onward and forward to this day when "industrial medicine" has been accepted as a vital part of the science and art of ethical medical practise.

It is true that various forms of legislation for Workmen's Compensation nurtured the seed of industrial medicine from 1910 onward, but in large measure it did so because idealistic physicians of the type I have mentioned had greater concern in their hearts for the injured man than for his injury alone, and looked beyond the cure to prevention. The industrial mobilization of the United States in the last World War gave great impetus to the cause of industrial medicine. Then came the first post-war depression. It hurt a little. The recent prolonged business depression hurt a lot. Too many persons, within and without industry, were still ignorant of the idealistic aims of our specialty, or unconvinced of its true value. Too many executives of business were inclined to look upon industrial health programs as expensive fads, to be restricted or eliminated in times of financial retrenchment. The reasoned conclusion spoken by Mr. Heacock, President of The Caterpillar Tractor Company, at a meeting in Chicago last fall when he said, "Any industry that can afford to stay in business, can afford a medical department," had not then dawned on many an otherwise capable executive.

Indeed, I recall at our meeting in 1933, DR. OTTO GEIER said he was then viewing "the life struggle of medical service in industry." It has been only by dint of the hardest work, by unceasing educative efforts, by capable performance and good results, and through the cooperation of far-seeing leaders in industry and business, that medical service did win its life struggle.

IN JUNE, 1935, our Association numbered 257 Fellows and Members, today it includes about 1300 directly, and through its 12 component societies reaching from New England to Florida and across the continent to California and beyond that coast to Hawaii; a magnificent increase in numbers, yes, but with no sacrifice whatsoever for quality. Men in this field must be, first of all things, men with hearts and minds attuned to the mental, the physical and the spiritual well-being of all who labor and toil and spin and sew for their daily bread, and for their loved ones, in their pursuit of happiness.

Over the years, therefore, we have seen the evolution of the industrial health program, conceived and born in the minds of humanitarian physicians and executives, nourished in the field of traumatic surgery, embracing accident prevention as a natural corollary, widening to the study and control of occupational diseases, the pre-placement and periodic health examination, and now, combining all these with the benefits of preventive medicine and industrial hygiene.

Is this health program in industry something new and revolutionary, Yes, if we consider the application and extension of its principles; no, when we recognize that all of its essentials were embodied in his "De Morbis Artificum" nearly two and a half centuries ago by Ramazzini, the Father of Industrial Medicine.

"Not only in antiquity, but in our own times, also," he said, "laws have been passed in well-ordered cities to secure good conditions for the workers, so it is only right that the art of medicine should contribute its portion for the benefit and relief of those for whom the law has shown such foresight; indeed we ought to show peculiar zeal, though so far we have neglected to do so, in taking precautions for their safety, so that as far as possible they may work at their chosen calling without loss of health."

In those few words, I venture to suggest, we have the sum and substance of the industrial-health-maintenance program of today.

The field for its further application and further extension is almost unbounded, even in times of peace. How true this is, how great has become the interest in the health of the worker, how costly is his disability, may be judged by the number and fine character of the groups now attacking the problem. To mention all that have been organized since 1916, and all that are now functioning from the Division of Industrial Hygiene in the U. S. Public Health Service, the Divisions of Occupational Hygiene in 34 states, The Council on Industrial Health of the American Medical Association, The Section on Industrial Health of the American Public Health Association, Air Hygiene Foundation, American Industrial Hygiene Association, Committee for the Conservation of Man-Power, down the list of numerous other bodies of high repute, would serve only to make the importance of the problem more manifest. And yet the recent survey by the American Medical Association disclosed only 4,086 physicians out of 175,000 in the country who are engaged in or have had experience in industrial medicine.

These 4,000 men are associated, for the most part, with the larger plants or they are especially interested in the repair of occupational injuries.

Generally speaking, health maintenance programs are inadequate in smaller industries in view of the fact that small plants make up 87% of all industrial plants and employ 62% of all industrial workers, and are reported to have a higher accident and disability rate than large plants.

I believe it to be the right, not only the privilege, of workers in all industries—small and large—to be protected from whatever health hazards may be inherent in their employment, and I believe it to be the duty of the employer to provide that protection. Ignorance of a hazard in the plant or in the employee's physical condition, makes for a poor defense.

One solution for this inadequacy of qualified industrial physicians lies in the compressed courses in industrial medicine and industrial hygiene, now available in several of our medical schools. By this means, the U. S. Public Health Service is providing capable men for the care of the civilian workers in our arsenals, while the Navy is conducting industrial health programs for civilians in its yards and allied establishments.

But such programs do not include within their benefits the men who build planes and tanks and arms and ammunition, and the women who toil at machines and assemble the instruments of precision. There is need for the additional training of physicians for private industry, especially for those who cannot spare the time for prescribed courses; there is need for correlating and disseminating the valuable contributions made by the many groups interested in the problem of the workers' health; and there remains the need for supplying adequate medical care to the workers in small industries, to somehow convince the employer of small groups that any industry that can afford to stay in business, can afford an adequate medical service, because death or permanent total disability is just as catastrophic for the workman in a small plant as it is tragic for one in General Motors, for example, and just as costly for the employer.

I BELIEVE that our meeting this week, in collaboration with the American Industrial Hygiene Association, will help immeasurably to fill that need, that it will be recorded as another milestone in the advancement of industrial medicine. I believe that the tireless and conscientious efforts of MR. WILLIAM P. YANT for the Hygiene Association, and of DR. T. LYLE HAZLETT for our Association, in organizing this week of graduate instruction, this Institute of Industrial Medicine and Industrial Hygiene will be of great benefit to all of us. We are sincerely grateful to them and to all who have helped them so generously. I believe that the program for the week, prepared by MR. GORDON HARROLD for the Hygiene Association, and by DR. LOYAL SHOUDY for our Association, has been unequalled in quality, unsurpassed in valuable instruction for the physician, the engineer, the insurance company representative, the industrialist, and for all who are humanely concerned with the health of the worker. We are sincerely grateful to MR. HARROLD and to DR. SHOUDY and to all who assisted them in their tasks. I wish publicly to declare my appreciation to MR. WARREN COOK, President of the American Industrial Hygiene Association, for his part in arranging this joint meeting, because I realize that we need each others assistance in the task that confronts us.

But these annual meetings do not adequately meet the requirements of all physicians in industry and of the hygienists and engineers and nurses

and safety men working with them. Many of these physicians devote but part time to this work, many working full time have no assistance, and neither group is enabled to attend our annual meetings away from home. It was the realization of this unsatisfactory situation, by previous officers of our Association, that prompted the organization of component societies in several states, or groups of states, or the inclusion in our Society of such groups already existent, not only conferring membership in the American Association upon them, but affording the men within a given area opportunity to meet together, to know each other better, to exchange ideas, to reap the benefits that flow from many experiences and free discussion. This, these men can do without loss of time from their work.

It is our hope now that each component society will appoint at least one delegate to the American Association to have a voice in the policy and direction of the parent society. Its object shall remain unchanged. It must continue to foster the study and discussion of the problems peculiar to the practise of industrial medicine and surgery, to develop methods adapted to the conservation of health among workers in industries, to promote a more general understanding of the purposes and results of the medical care of employees, and to unite into one organization members of the medical profession specializing in industrial medicine and surgery for their mutual advancement.

I conceive it to be the duty of the officers of this Association to encourage the further development of component societies throughout the country, and to assist them in every feasible way to keep high the standards of industrial medicine and surgery in their communities. I believe our Association should provide and finance a responsible medical officer to visit and otherwise have frequent contact with our component societies.

I conceive it to be the duty of the officers of this Association and of the component societies to somehow correlate all of the effort now being expended, not without a measure of duplication, toward conservation of man-power in industry. With full appreciation for the very valuable contributions made by chemists, toxicologists, engineers, nurses and safety organizations, I conceive it to be the function and the duty of the physician in industry to correlate and supervise all these activities, for after all, he is the doctor, he is responsible for employee-health, he is medical care, a fact that is frequently overlooked or forgotten.

I believe that with the cooperation of the membership of the component societies, none other than men of character and of high ethical standards shall gain admission to our Association.

I believe that through the fellowship developed in the local component societies and of the member contacts with private physicians, the opportunity exists for a better appraisal and a more satisfactory understanding of occupational injury and disease, and of the resulting degree of disability to the end that the worker and the employer alike will be assured of the best medical care at a fair cost, and that testimony before legally constituted bodies may be less partial and less open to criticism.

ABREAST of us today is the problem of National Defense and aid to other nations, tomorrow it may be actual warfare. In order that our military forces may be able to carry out their mission, whatever that may be, "it is necessary that there will be as many men at as many guns as many days as possible." Today, it is our mission to keep as many men at as many tools as many days as possible.

It is obvious that the health of the workers in industry is vital to the success of our Army and Navy. There is no sense arguing with the fact that in modern warfare, armies without supplies cannot endure. Belgium capitulated, not a traitor to its allies, nor for want of man-power, not for loss of courage, but for want of machines for war, want of weapons and of ammunition. France, prideful of what had for long been termed the best fighting men on the continent, quickly succumbed to the inertia or treachery that denied it adequate weapons and supplies for those fighting men. Lacking supplies and fighting material, every army will be lost.

Congress has appropriated many billions of dollars for National Defense. A million and a half of young men are now engaged in military training. But not one penny of these billions of dollars, not a single soldier, or all of them together will be the least bit effective in our country's defense until the men and women in vital industry have turned these dollars into ships and planes and tanks and weapons with which our military forces can be equipped.

The industrial workers' physical fitness, their freedom from preventable disease and injury, their morale or mental stamina, their ability to achieve for National Defense, will determine almost entirely the effectiveness of all other efforts. Desirable in the easy days of peace when no cloud of war blackened the horizon, it is imperative now that the workers in industry, especially, "must be physically tough, mentally sound, morally strong." If they are not, we can leave our planes unbuilt, our battleships in blueprint. We shall not need them. It is our great privilege, it is our patriotic duty, to contribute our best to the conservation of the health of these necessary men and women in industry so that our armed forces may be assured of material and supplies in unending streams around the clock to every point of need.

Where, you may ask, lies our opportunity? Very recently, Mr. William S. Knudsen said, "The next 27 months will see the country on a billion-man-hours per month rate of production. And if you can save a billion man-hours during the next 27 months, you'll be saving enough time to make 10,000 medium-sized bombing planes. That's well worth saving." I'm sure Mr. Knudsen would rather build the means for happiness, but bombers we need, bombers will be built.

Last year—1940—17,000 persons were killed at work, 10% more persons than in the previous year,

and upwards of 1,400,000 others were permanently or temporarily disabled by work accidents. We see in that awful picture the needless wastage of 1½ billions of productive man-hours in 1940 or 3½ billion man-hours in 27 months. We are asked to save but a fraction of it. Coincident with the increasing speed-up of industry, the introduction of new processes, the assimilation of "green and rusty" employees, crowding and confusion, work accidents and lost man-hours will increase unless all of us—doctors, engineers, safety men, nurses, foremen — exert ourselves, drive ourselves, to greater efforts for safety in industry.

Attention must be focused upon the small plants, plants pretty generally void of medical service, wherein the accident rate in 1939 exceeded that in the largest plants by 58%, and wherein the severity rate was 21% greater. It seems needless for me to repeat that any industry that can afford to stay in business cannot afford to be without an adequate medical service. Changing social and political trends may force an appreciation of that truth upon tardy management.

Last year, motor vehicle traffic took a toll of 34,000 human lives, permanently disabled 100,000, and temporarily disabled more than 1,000,000 other persons. Some of these victims worked with you, and with me. Their productive work hours are lost, some for a while, some for all time. We are asked to save but a fraction of them. I believe we can help.

Last year, 32,500 persons died from accidents in their homes, and 4½ million were injured; 4,200 persons were killed in railroad accidents, and 27,000 injured. Directly and indirectly, all these accidents represent the loss of precious productive man-hours. We are asked to save but a fraction of those hours. I believe we can help.

Non-occupational diseases, all the ills of the body and of the mind and the emotions to which the human flesh is heir, deprive industry annually of 2¼ billions of productive man-hours. Some of it is unavoidable, some of it we may salvage through proper placement, preventive medicine and cooperation with the private physician, some of it can be avoided by stimulating greater loyalty to the job in this critical hour.

We are asked to save a fraction of all these billions of man-hours, lost hours that are not alone a challenge to our present economy, but should war, in all its force and fury, break upon us, lost hours that could be a challenge to our very lives. We must meet that challenge now—not then. I believe we can help.

In November, 1940, Mr. Sidney Hillman of the Office of Production Management, declared that the National Defense program in industry would by Easter, 1942, require five million more men, Daily, new industrial plants are assembled with unprecedented speed, older plants expanded, and others converted for the war industries. But again, we must define industry in terms of the men and women who make it productive.

Whence will come these millions of workers and what kind of man-power will it be, are questions which must concern the physician in industry.

Selective Service figures recently released, disclosed that nearly 40% of the young men called for service were found disqualified upon preliminary or induction physical examination. That is a depressing revelation, a sad commentary applied to men in the age group that should be most physically and mentally well. Without doubt, these young men have experienced too many depressions, lived too long in a state of world upheaval, have been too long deprived of the normal way of life. Some of them may be rehabilitated for military service, but most of them rejected for defects —great or small—must become a part of the great industrial army behind the lines.

Thousands of other young men are being rushed through Vocational Training Schools without thought for their probable physical defects or programs to remedy them, and many of these will seek a place in democracy's arsenal of defense.

We must study the defects of these young men toward their proper placement that they may serve best and most safely for themselves, their fellow-workers, and for industry in view of their impairments, and we must guide them and aid them toward the correction of their remedial defects.

We are faced with the task of protecting present workers from the spread and the intrusion of communicable diseases. Studies have disclosed that the death rates from tuberculosis, age period for age period, are from two and a half to nearly four times as high among industrial workers as among professional, mercantile and agricultural groups. The hazard of venereal disease, always present, tremendously increases in time of war. We must be alert to early discover and isolate these obstacles to maximum production. We must anticipate fatigue and the problems of community health.

These duties are not ours alone, for we have the incalculable assistance of the great body of medical men and our expanding public health services. But ours is an unescapable duty for all of that.

FURTHER, I believe that what I have mentioned about young men, applies equally as well to the older men and women who must fill industrial posts as youth goes to war. Many, formerly regarded as superannuated, too old or too slow to carry on, have been called back and more will be required. What of them?

Dr. Edward J. Stieglitz, of the U. S. Public Health Service, points out that generalities concerning babies are far more justified than generalities concerning the same individuals 40 years or more later, since each person has accumulated a highly personal set of experiences, infections, intoxications and mental actions and reactions. He concludes that "the greater the age, the greater the individual variability." Yet we know that the older workmen, though they may lack the speed of youth, match it, yes, surpass it in skill, in judgment, in spirit of cooperation, in reliability, and in loyalty. The advancing age of our population make-up, will probably make the continued employment of older persons essential even in peace-

time industry. Therefore, the industrial physician must be equipped to meet this trend by making the diseases incident to the process of aging a special study. He must not make the mistake of measuring age and capacity by the yardstick of years alone. It will not do.

Neither can any hard and fast rule be laid down for those persons classified as handicapped among whom, I believe, there is an abundance of manpower that can be efficiently used for National Defense. Here again, the industrial physician must look beyond the mere handicap to the latent talents and capacity of the individual. Properly placed, they seldom become a hazard for themselves, for others or for industry, and as a group they appreciate the opportunity for economic independence; they are loyal, their safety and attendance records compare very favorably with other groups. They should be no nightmare to anyone, any more than those who become handicapped in the course of employment. Drs. George and Allen recently reported an excellent study of this subject, stating that what they termed the "conservation" and "reclamation" of the physically handicapped is not alone desirable from the viewpoint of professional standards and humanitarism, but it is also sound business as well.

It is generally conceded that from 20 to 30% of the working population in the United States is nervously weak and emotionally unstable. We have not more, but less, reason to hope that the speed-up of industry for defense, the stresses and strains and the sacrifices made necessary by a world at war will make our workers more stable. It would be rash to ignore the fact that mental and emotional well-being must go hand in hand with physical well-being. More than ever today, the industrial physician and surgeon, the industrial hygienist, and the industrial nurse, must be on guard for the harmful effects of the mental as well as the physical stresses of a rapidly developing industrial program for National Defense. On many an occasion, the industrial physician, with a kindly question, a receptive ear and a few words of common sense, may do more to help this type of patient than all the art and science at his command could otherwise accomplish.

With the exigencies of the National Defense Program in industry facing us, therefore, we must be alive to utilize to the best advantage of the worker himself and of industry, whatever manpower we have—young, old, defective or handicapped, saving man-hours from avoidable accident and sickness disability, by encouragement and example, instilling loyalty and a will to work.

When Winston Churchill became Prime-Minister of England, he said he could offer his compatriots only "blood, toil, tears, and sweat," if they would keep their way of life.

Let us not deceive ourselves either, for America must also sacrifice if its people are to keep their way of life.

So let us pledge ourselves to see that no blood is spilled nor tears shed where blood and tears may be saved, mindful that the labor of the men and women in industry weighs heavily in the coin with which America must ransom liberty and freedom for the suffering nations in a world gone mad, denying God and the brotherhood of man.

Some Practical Results of Physical Examinations

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THE scope of this paper is restricted to a report of practical results of physical examinations at one industrial clinic serving one plant—the Examination Clinic at the Indiana Harbor Works of the Inland Steel Company. Practical results are considered to be advantages that have directly followed physical examinations of plant employees and applicants for work, advantages that have fallen to any or all of the three most interested parties: the examinee, the employer, and the medical examiner. Practical results are further considered to be those which are at least somewhat measurable and countable. In the time allotted it will be possible to present only the results which have impressed us as being of greatest importance.

Even these will have to be presented in an abrupt, factual way without the full discussion each point merits.

The routine of complete physical examination used at our clinic is essentially that devised by D. E. Cummings for use in the examination clinics at iron mines in Upper Michigan and Northern Minnesota. The routine has been described by him, and the routine with our modifications have been described by myself, in previous papers. Briefly, a medical and employment history of each examinee is taken and recorded by a trained clerk.

The history form asks direct questions that develop leads toward diagnosing most illnesses. Where such leads develop, more specific questioning is pursued by the examining physicians. The physical examination covers all systems of the body. The examiner's instruments are limited to a Snellen wall chart, tongue blades, nasal and aural specula, ophthalmoscope, stethoscope, a blood pressure instrument, and finger cots. A chest roentgenogram is routinely made. The routine laboratory procedures are carried out by trained technicians, and consist of a hemoglobin percentage determination, total and differential W.B.C. count, red blood cells sedimentation rate, a flocculation test for syphilis, a vital capacity determination, and chemical analysis of the urine for sugar and albumen. The scheme calls for medical examiners of average proficiency. A minimum of 20 minutes of time should be allowed per examination, and privacy should be provided that permits stripping the examinee for at least part of the examination.

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THE examination routine as described discovers most cases of chronic illness that rank high as causes of death among industrial workers. In addition, many conditions that produce or lead to partial disabilities or which influence compensation problems are picked up with satisfactory regularity. Among these are impaired vision and hearing, focal infection, syphilis, hernia, and impaired joint motion. Several shortcomings of the routine are recognized. Early, sub-surface cancers are missed, as are many cases of coronary artery disease. Precise diagnoses of chronic abdominal complaints are rarely made. The skills of history taking and diagnostic procedure required to make diagnoses of this type are usually not to be found in industrial medical departments. Recent work has challenged the efficacy of visual examinations limited to the use of Snellen wall charts. It is possible that examining procedures using the telebinocular instrument may have to be added to the present examination. Routine electrocardiography may or may not be the answer to missed cases of symptomless coronary artery disease.

The discovery of major physical defects in workers has been considered by us to be a practical result of first importance. As used by us the term refers to defects of a magnitude requiring special consideration with respect to continued employment. Of the first 15,000 different individuals consecutively examined, 8085 were applicants for work and 6915 were employees. Among the employees there were 243 individuals, or 3.5%, with major physical defects. The diagnoses made had principally to do with cardiovascular diseases, impaired vision, amputations, and tuberculosis. Corrective measures could be instituted in some of the cases, but the majority remained problems in proper placement at work. Most of these have now been solved to the satisfaction of the employee, his superiors, safety officers, and the Clinic staff. Once a job is agreed on in these cases, no change can be made without permission of a responsible person in the medical department.

A FEW specific conditions merit individual discussion in this report. The first of these is hernia, nearly 300 instances of which were found among the employees. The majority of the affected men were permitted to continue at their regular jobs, with and without trusses. Most of the individuals have been seen repeatedly, and several have had herniotomies done as a result of the interest shown.

About 20% of our men have visual defects that require wearing corrective glasses at work. Many of the defects were originally discovered during the routine examination at the Clinic. Some workers were found at the time of examination to be wearing glasses that did not provide adequate correction. For the most part corrections are now satisfactory. The employees of the plant carry clock cards stubs bearing their check numbers and other identifying data. A portion of the stub is reserved for the so-called Clinic code which is intended to give enough information to insure safe employment. Men who need to wear glasses at work are so coded, and foremen see to it that the recommendation is carried out.

Over 300 employees were found to have cases of syphilis (mostly latent), and have been referred to proper places for treatment. An effort has been made to individualize their supervision, and much time has had to be devoted to the reexamining, interviewing, and letter writing that go with good supervision in a syphilis treatment program. Our workers are reporting to private physicians, to part pay and charity Clinics, and to medical school dispensaries scattered over the entire Chicago-Calumet area. It has been possible to keep in close touch with all cases and to exert constant pressure on them. The end results cannot be evaluated for some time to come. They will probably fall short of the optimum, but we believe our cases have been more thoroughly treated than they would have been without the supervisory efforts expended by the Clinic staff.

The examinations to date have revealed 653 cases of tuberculosis among employees and applicants for work. Over a hundred of the cases were considered to be active or probably active. An additional hundred cases, though diagnosed as being old, were considered to be in need of clinical supervision. Applicants with any amount of re-infection tuberculosis were rejected for employment, and were referred to family physicians or to sanatoria for follow-up. Employees found to have tuberculosis were in most instances permitted to continue work of some kind. A scheme of close cooperation between our own staff and that of our county sanatorium was developed which benefits our employees considerably. The responsibility for supervising each case is borne by both staffs, and disposition of questionable cases is arrived at after conference between the two. Workers can usually be kept at their jobs longer than would otherwise be possible, and relapses are discovered early. Production supervisors have cooperated with us splendidly in providing modified work for men returning from a cure at the sanatorium. More than one employee owes his promotion out of the ranks of labor to a better and physically easier job to just such a circumstance.

It was possible to make an accurate prediction of sudden death in five of the employees examined. Only one of these men died at work. He had been placed on restricted work in a restricted area, and there was no question of a contributing occupational cause in his death. It is readily admitted that several instances of sudden death were not predicted in individuals who were examined within the year preceding their deaths. The cases were in individuals who, so far as was known, died in their first attacks of myocardial infarction, or in individuals with known cardiovascular disease, the gravity of which had been underestimated by our own staff.

PRESUMABLY the definition of "practical result" may be extended to include the acquisition of practical knowledge. If so, one result

of the examination program has been the gradual development of knowledge of the industrial medicine of our own plant. Working environments are constantly being surveyed by plants chemists for information concerning concentrations of dusts, fumes, gases and vapors known to be harmful. Where concentrations are grossly out of line with the accepted threshold values changes in job practises or engineering improvements are, of course, inaugurated at once. But borderline concentrations can only be interpreted in the light of the clinical finds in workers exposed over prolonged periods to the substances in question. It has been interesting to note how the original estimates of various borderline hazards have been scaled either up or down as time has gone on. The factors of physical surroundings are rarely duplicated in any two plants manufacturing precisely the same product with the same type of equipment. A suspected health hazard may be a real one in one plant and be of no significance in another. The true situation in neither can really be understood unless there is a combined study of environment and exposed men.

A result considered by us to be of some importance is our own increased understanding of the relative values of the different examination procedures. For instance, it was discovered upon review of 482 cases of syphilis diagnosed by repeatedly positive serologies, that only 11 men, or 2.28% of the total, gave histories of venereal infection. It was clear that direct questions pertaining to venereal disease might as well be dropped from our history form. Eighty-two men, representing 17% of the cases, presented physical signs that aroused the examiner's suspicion of the presence of syphilis. Eighty and seven-tenths percent of the cases were discovered by serological tests alone, and would have been missed had not all men been subjected to serologic testing. Enlightening, too, in this respect has been a review of 138 cases of active tuberculosis diagnosed on first examination. All case studies included chest x-rays as a part of the examing routine. Of these individuals only 31, or 22%, admitted symptoms. Twenty-eight, or 20%, presented physical signs of chest disease. Sixty-nine, or 50% of all cases, showed a blood sedimentation rate greater than 10 mm. and/or positive sputa. Allowing for the overlap in which two or more groups of findings were present, histories, physical examinations, and sedimentation rates might have aroused a suspicion of active pulmonary tuberculosis in 80, or 58%, of the cases so proved. Put in another way, 42% of all cases of active tuberculosis would have been missed had not every individual in the plant been x-rayed. A separate analysis regarding the value of the sedimentation rate shows that if all examinees with rates greater than 20 mm. per hour are given chest roentgenograms, one-third of all cases of active tuberculosis will be discovered. As a single screening procedure it thus exceeds in positive value either history taking or physical examination of the chest at our industrial clinic.

The blood sedimentation rate continues to prove itself of value as a screening test for a long list of diseases in their active states. The test has no specific diagnostic value. An increased rate simply means that some active disease state is present. Once a proper diagnosis has been made. the increases and decreases in the rate accurately measure the ups and downs of the disease. When its use by us in routine physical examinations is added to follow-up work and to partial examinations for one reason or another, our experience with the sedimentation rate during the past five years adds up to well over 30,000 determinations. We have come to consider it the most valuable single laboratory procedure available to our staff. Happily, it is also one of the cheapest and most easily performed.

A REALLY fundamental piece of knowledge regarding our plant's population still needs to be developed: We need to know the optimum period for re-examinations, and whether that varies with age groups. We do know that the incidence rate of tuberculosis increases measurably with each five-year period. The degenerative cardiovascular-renal diseases, of course, show increasing incidence in each progressively higher age bracket. It is our impression now that an examination interval of five years is too long, even in the lower age groups. Reference here, of course, is to general health examinations and not to examinations pertaining to supervision of men exposed to known hazards.

Chest films of two cases can be shown to demonstrate how dramatically new infections of tuberculosis occasionally develop. The first case is that of a colored laborer, examined at the age of 37 years, and found by a stereoroentgenogram to have normal lungs. Three years later he asked to be examined again because of cough and weakness he had experienced for one month. The chest film showed moderately advanced, active tuberculosis. He died of the disease seven months later. The second case is that of a young white man, a shear operator, who was examined at the age of 20 years. The chest stereoroentgenogram showed no evidence of pulmonary tuberculosis. He was called back in a routine way for re-examination 3½ years later. During the interview he complained of a cough of three weeks' duration which he attributed to cigarette smoking. He was found to have far advanced, active tuberculosis, and he has now been in bed at a sanatorium for more than a year.

Summary and Conclusion

AN examination routine is described which does fairly well at discovering most cases of chronic illness among workmen.

2. The important shortcomings of the examination are that it fails to make diagnoses of chronic gastro-intestinal diseases and of asymptomatic coronary artery diseases.

3. The routine physical examination forms the starting point for several worthwhile programs,

among which are the following:

(a) replacement of men to jobs where they do not present a departmental or personal safety hazard, and where they may work with a minimum of aggravation to their own chronic illnesses;

(b) corrective measures, such as wearing of proper glasses, can be insisted on, and a large group of potentially unsafe workers thus benefitted; and

(c) supervision and early treatment can be started on a significant percentage of workers discovered to have syphilis, tuberculosis and cardiovascular disease.

4. The information gained from routine examinations provides a good base line from which to form accurate opinions of the health hazards associated with certain jobs. When hazards are borderline final opinions rest on findings at repeated examinations of men exposed over prolonged periods.

TUBERCULOSIS

138 CASES ACTIVE AND PROBABLY ACTIVE AS DETERMINED BY X-RAY FINDINGS

Arranged to show laboratory findings

	No. Cases	Totals
Sedimentation rate less than mm	69	
Pos. sputum, sed. rate under 10 mm	2	71
Sedimentation rate 10-20 mm	24	24
Sedimentation rate 20-30 mm	11	
Sedimentation rate over 30 mm	15	
Pos. sputum, sed. rate over 10 mm	17	43

31.8% of all cases of active and probably active cases are discovered if chest films are made of individuals with sedimentation rates greater than 30 mm.

Discussion:

DR. C. D. SELBY (Detroit, Michigan): I was very much pleased with Dr. Kammer's paper, naturally, as I am sure that you were. He has outlined an excellent examination program and he has shown you results of a practical nature. Now, what can I add to what he has already given you?

The thought occurs to me that Dr. Kammer, just as you and as I have been asked many times, wonders how to justify such a program. Can you justify such a program on an economic basis?

I know that question is put up to me very, very often. How do you justify this investment in x-ray equipment, this apparatus for sedimentation, and so forth?

In answer to that, I want to outline one case that happened over in the State of Jersey. The man applied for a job and in examination, the doctor found minimal lesions of his left apex. He explained it to the man, and the man said, "Well, I tell you, doctor, there has been some question about my chest but I have never gotten anybody to say that it was tuberculosis."

The x-ray demonstrated, I think, rather conclusively that the man had minimal tuberculosis. He was referred to the health department clinic, was sent to a sanitarium, and is now getting care.

Here is the remarkable part of the incident and what justifies the program more than anything else: The wife of this young man wrote a letter expressing gratitude to the management of the corporation for the discovery of this minimal lesion in her husband and his rejection from employment; expressed appreciation of the treatment started at the recommendation of the plant physician.

I was visiting a plant down in Indiana a short time ago. The doctor had just completed his annual survey and no active cases of tuberculosis were found. I reported that when I came back to Detroit, and that memorandum went clear up to the office of the Chairman of the Board of Directors. Justification enough!

Another plant had a syphilis rate of about 3%. Three weeks ago on the final check-up, it was found to have 0.1% positives. One tenth of one per cent! It is amazing. I can hardly believe it myself. I sent a memorandum in to the front office when I got back to Detroit, and again that went clear up to the office of the Chairman of the Board.

As long as the physicians of industry can show results like that we do not have to justify programs such as Dr. Kammer has in terms of dollars and cents. Our justification is in terms of humanity. I congratulate the Doctor on his paper.

Trauma and Disease

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THE relationship between trauma and disease seems to have been recognized in the oldest medical document in the world. In the Edwin Smith Papyrus an ancient Egyptian military surgeon accurately described the rigidity of the neck associated with meningitis following a penetrating wound of the skull. Centuries before bacteria were known as causes of disease trauma had established its place as an etiologic agent. Industrialization and more humane levels of social consciousness have combined in our day to enlarge the importance of trauma in this role. One because it vastly increased the hazard and frequency of trauma, and the other because it made obligatory the acceptance of a type of paternal responsibility to supply some measure of relief from the effects of trauma.

The subject itself is so large as to cover almost the entire field of medicine in its possibilities. Also it is in a very fluid, formative state and is rapidly expanding. In such a condition it projects itself very often into the realm of theory or conjecture. Hence a considerable portion of it is very obscure and uncertain, as much or most of the field of bacteriology was two generations ago. It is also handicapped in its orderly scientific development because it is influenced by abstract or specific decisions of laymen which in effect establish the role trauma as a cause of a given disease long before science can prove or disprove such a role. It is peculiarly retarded in its development because often the injured person is unwilling to tell the whole truth about the state of his health either before or after an injury. Frequently the history as given states he was entirely well before and has never been well since. Textbooks on the subject of trauma and disease have tried to bring some order out of this chaos. They established certain postulates, apparently attempting to make an analogy to Koch's Postulates. Unfortunately it is an analogy in name only. The best that may be said for these postulates is that they are guides for orderly thinking. They do not prove or establish anything. There is a small limited field in which the relationship between trauma and disease is certain and definite. There is a much

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larger one in which it is, at best, very uncertain. There is also a large one in which it is possible or probable. It is natural that, at the moment, we can be interested only in the latter fields. It is in them there is greatest need for industrial medical research, for the accumulation of autopsy material, for the compilation of clinical data and for the exercise of dispassionate judgment.

THE personal experience of any single physician in the subject of trauma and disease, however great it may be, cannot embrace the whole field. It seems certain that the orderly study of this subject has been seriously distorted because, until very recent years, it remained almost the exclusive province of the surgeon. This is said not with any thought of disrespect to the surgeon. It seems a very simple fact, of which there must be numberless instances in the experience of all of us, that a disease process, be it of traumatic origin or not, is apt to be regarded in a somewhat different light when it is reviewed by one whose daily activity is concerned in the treatment of disease or injury by other than surgical measures. Happily, the importance of the internest in the relationship of trauma and disease has rapidly expanded in a development which has but fairly begun. It may be expected confidently that a more balanced relationship between the conjugate skills of the industrial surgeon and the internist or industrial physician will do much to clarify what is now obscure in the relationship of trauma and disease.

The internist in an industrial community has an important part to contribute to this clarification. This is true if he is fully engaged in industrial medical work. But is probably more true where only a little or not a very important part of his daily living arises from dependence on industrial or insurance practice. Inevitably the latter state helps him to view the various problems involved with less bias and greater opportunity for freedom of thought. In addition, he is very likely to have a much wider experience in the general field of medicine. Also, since he is usually employed only in those cases where the relation of cause and effect is most uncertain and obscure, and where litigation is impending or in progress, he thus has a special opportunity to consider this subject in that very cloudy portion most needing study and clarification.

One so engaged soon observes some perplexing problems in the relationship between trauma and disease. One of these might be expressed as the individual variation in potential for neurotic reaction to injury. Since this subject will be presented in greater detail in another part of the program it will be mentioned only briefly now. The widest possible extremes in nervous system reaction to injury occur, and must be common in the experience of all of us. A man was injured late at night in an automobile accident, sustaining, among other injuries, a very severe laceration of the scalp. With the assistance of others, he righted his car, which had been overturned, drove 50 or 60 miles to his home, wrapped up his head and went to bed and to sleep, not wishing to disturb his family physician at such an inconvenient hour. The following morning, arising at his accustomed time and partaking of his usual breakfast, he saw his physician, had the necessary 10 or 12 stitches put in his scalp, went to his daily work and so continued. This behavior seems remarkable. It is really not so but entirely characteristic of the man. He is an example of one with a very low potential for neurotic reaction to injury. In contrast with this case is that of a woman who, while riding in an automobile which was almost involved in a collision, was so disturbed by the shock to her nervous system caused by the fear of what might have happened that she became a neurotic invalid. She had a very high potential for neurotic reaction to trauma, in this instance psychic trauma caused by acute fear. One can scarcely help but be amazed by such examples and is tempted to fall into the error of admiring the behavior of one and despising that of the other. Such an error would warp one's medical judgment. Neither praise nor blame is justified. Each of these patients reacted to injury in a way characteristic of him and probably wholly instinctive. Traumatic neuroses are among the most difficult problems in the relationship of trauma and disease. Certain physical signs or stigmata of nervous instability tend to present in those with a high potential for neurotic reaction to injury. They are variability of pulse and blood pressure, inconstant flushing of the skin of the face, neck and upper anterior chest, excess axillary and palmar sweating, exaggeration of reflexes and slight elevation of temperature. Traumatic neuroses may cause complete disability. They cause extraordinary amounts of inconvenience, unhappiness and actual suffering. The fact that they tend to disappear after settlement of litigation does not make them unreal. They deserve and require in the main a much more sympathetic and helpful attitude on the part of the defendant's physician than they generally receive.

THE degree of acceleration or aggravation of a pre-existing disease by trauma is almost as difficult to determine as the degree of neurotic reaction. Pre-existing disease may have been wholly unknown to the patient and his statement of perfect health before accident may be the exact truth as he believes it. Yet, injury having occurred, a chain of symptoms now appear of which many may be due to the disease which was already present and few or none to the injury. But one cannot expect the patient to believe this. In this difficult situation large clinical experience in the given disease is of immense value in helping the physician to adopt an opinion. Sometimes his opinion must, of necessity be somewhat arbitrary, based on probabilities, because there are no satisfactory scientific facts to guide him. One of the most difficult problems in this regard is encountered when an attack of coronary or cerebral thrombosis or hemorrhage occurs while the patient is at work. This is especially true if the work involves hard manual effort. May we consider for the moment coronary thrombosis oc-

curring under such circumstances? This condition is common. It presupposed the presence of atherosclerosis of the coronary arteries which may exist for a long time without any recognized subjective symptoms. The mechanics of the production of coronary thrombosis must still be regarded as uncertain. An atheromatous ulcer gradually enlarges, its surface being built up with exudate until the lumen of the vessel closes, or a fragment of the exudate breaks off and is carried by the blood stream until in its progress it completely occludes the narrowing lumen of a more distal part of the vessel. The latter would be a splendid explanation of the occurrence of coronary thrombosis after violent effort. Unfortunately it is very rarely proved by autopsy so we must conclude it seldom occurs. Then there is the incontrovertible fact of clinical experience that a very high proportion of coronary thromboses occur when the patient is at rest, especially when he is asleep. Last May a very powerful muscular middle aged man, who had always done hard manual work carried a hundred-pound tackle up more than 50 steps. A few minutes later, in the act of taking a drink of water, he felt very severe pain under the upper sternum. In spite of this he continued at work that day and several days following, the pain varying considerably in degree. Eventual examination revealed indisputable electrocardiographic evidence of the infarction stage of coronary thrombosis. Would it be good medical judgment to say this disease occurred because of a specific hard physical effort? One would have to disregard the fact that he had done such work daily for years. Why had not the attack occurred long before? For the present it seems best to conclude that coronary thrombosis is an episode in the progress of disease of the coronary arteries. Except in very rare cases it may be regarded as co-incidental whether the man or woman in whom it occurs was doing hard or light physical work, or in fact, any work at all. Yet this question has not been settled and requires more accurate information than that we now possess.

Many tempting vistas of conjecture open out before us for speculation. One would like to dwell on the element of time. Could a man who had admitted myocardial degeneration with major subjective symptoms before the fracture of a forearm have died four and a half years later as an indirect result of this fracture aggravating the pre-existing myocardial degeneration? This seems a little absurd in the abstract but has been the subject of serious litigation. A mechanic sustained an infected lacerated wound of his left arm. During the course of the febrile reaction to this it was discovered he had a heart murmur. This was improperly interpreted as being a sign of complicating endocarditis arising from the infected wound. It was really one of the many signs of syphilitic aortitis from which the patient died a year after the accident. His widow was granted compensation through a gross miscarriage of justice, because a lay referee believed the discovery of a heart murmur during the course of infection was a sign of endocarditis. He could not accept the possibility that the murmur preceded the infection because there was no testimony to prove it. It would be interesting to speculate on the possible effects of electric shock, on the susceptibility to silicosis, on the effects of exposure to dampness or to sudden drenching and many other conditions, but lack of time prevents us.

THE complexity of a subject has never been a long deterrent to the inquisitive search for scientific truth. We need not be too much dismayed by the present obscurity that enfolds the relationship of trauma and disease in so many of its aspects. A bright page of honest study in this difficult field is even now being written as your meeting here attests. As always in the past, truth, sanity and right will eventually prevail. So that portion of the medical profession particularly concerned with trauma and disease will press its study with the well worn but useful instruments of scientific curiosity, a desire to know the truth and a will to do justice to employer and employee alike. The problems of trauma and disease deserve the attention of the best minds in medicine. Though an old subject it is an almost virgin field for a growing type of industrial medical research. Brilliant accomplishment of the recent past gives great promise for the future.

Discussion:

DR. FREDERICK W. SLOBE (Chicago): DR. COLWELL's splendid presentation of this important subject leaves little to be added. I have, therefore, merely summarized a few points which, I think, merit emphasis and even repetition.

CANCER: Except for certain well-known occupational cancers resulting from chronic mild irritation and repeated trauma, the occurrence of a malignant tumor as a result of a single trauma is exceedingly rare and, before being so considered, Ewing's five postulates must be fulfilled.

Diabetes: Thomsen's investigations strongly indicate that trauma does not cause diabetes mellitus, the relatively frequent elevation of fasting blood sugar, abnormal dextrose tolerance curve, and glycosuria following trauma, lasting only a few days. However, trauma causes an exacerbation in pre-existing diabetes in 50% of cases, lasting about four weeks.

SYPHILIS: It is well-known that a brain injury of sufficient severity to cause unconsciousness, may be followed immediately by symptoms of paresis in previously symptomless syphilitics.

TUBERCULOSIS: The immediate x-ray of chest injuries is valuable to demonstrate the presence or absence of a pre-existing pulmonary tuberculosis and to serve as a basis of comparison with subsequent x-rays, thus greatly aiding the analysis of the sequence of events following the trauma.

Trauma may accelerate a pre-existing extra-pulmonary tuberculous lesion but rarely directly causes its localization. We must distinguish between the rarity of actual tuberculous infection being caused through trauma and the relative frequency with which the disease itself, that is, pulmonary tuberculosis, is activated by trauma.

CIRCULATORY SYSTEM: The time relationship is very important here. Since the increased blood pressure resulting from undue strain lasts only about a half minute symptoms of ruptured aneurysm or apoplexy, should be manifest within two minutes following the strain. Angina and cardiac collapse, likewise, should cause immediate symptoms.

LUNGS: Minute emboli, either bacterial or non-bacterial may be set free by trauma anywhere, reaching the lungs and causing various pulmonary affections: infarcts, embolisms, and inflammatory conditions. It is well to recall that suddenly fatal pulmonary embolism

without previous manifestations occasionally occurs following a slight injury incurred weeks previously.

ACUTE LOCAL LYMPHADENITIS: This frequent condition is not caused by direct trauma but results from infection in the lymphatic drainage passage. This infection may have been slight and entirely healed weeks previously.

PERI-ANAL ABSCESSES: For a traumatic connection to be considered, several days should have elapsed since the injury.

RUPTURED PEPTIC ULCER AND OTHER VISCERA: Pascal's law relative to the equalization in all directions of pressure on enclosed liquids or gases, indicates the rarity with which the rupture of an ulcer can be ascribed to indirect strain. The same applies to other hollow viscera. A torn viscus may result, however, from direct pressure forcing the viscus against the vertebral column. Trauma has been known to cause acute peptic ulcer.

ACUTE INFLAMMATORY ORCHITIS AND EPIDIDYMITIS: These are not caused by injury, the sequelae of direct trauma differing materially from the cardinal symptoms and signs of inflammation. Likewise, indirect strain is rarely a factor, though somewhat presumptive if followed very soon by a discharge with signs of inflammation in a day or two. Latent infection, of course, pre-exists, either non-specific or specific, in such cases.

SUB-DURAL HEMATOMA: This fascinating lesion may occur following even a trivial skull injury, and may remain relatively dormant for a long period, gradually causing symptoms which may be mistakenly diagnosed as psychasthenia, various other neuroses, and even insanity.

HERNIA: The manifestation of an aggravation of a pre-existing hernia by sudden strain is not confined to strangulation but includes the tearing of intra-saccular adhesions with resultant hemorrhage. Such an instance operated on by us recently revealed a hematoma in a direct hernial sac resulting from a torn omental adhesion.

The Los Angeles Industrial Hygiene Program

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THE public health problems of a state are but a summation of the problems of the areas and communities of which it is composed. Such problems as communicable disease control, environmental sanitation, infant and maternal hygiene are dealt with adequately in most of those communities. Public health administration in the state is therefore organized to meet the needs of those areas which have no local public health program as their own, and to assist and advise the others when needed. Although California is a major industrial state, much of its industry is concentrated in several well defined areas which have effective general health programs, but which, until recently, have had no facilities or special organization to look after the health of their industrial population. Recognizing industrial hygiene as a modern vehicle for extending public health benefits to this important population group, our State Department of Health was progressive enough to establish an Industrial Hygiene Service as one of its bureaus, with Dr. John P. Russell as Chief. Since then, Dr. Russell and his staff have carried on an outstanding hygiene program in California industries. However, in accord with the prevailing policy of the State Health Department, areas which are capable of doing so are encouraged to expand their public health organizations and programs sufficiently to assume local responsibility for administration of activities which would otherwise be carried on by the state. This merely expresses a principle of American government that local needs are more conveniently and expeditiously dealt with under local governmental organization. Because Los Angeles is one of the major industrial centers of the state, supporting 23% of the state's gainfully employed population, it was logical that it, too, should accept this point of view and recognize the value of an industrial health program under local administration. Additional impetus toward such recognition was received following a public health survey which was recently completed in the City by the U. S. Public Health Service.

The recommendations of this survey included one that the City Health Department should initiate an industrial hygiene program. This recommendation was based on the analysis of a preliminary study of occupational hazards in Los Angeles industry previously made by the State Industrial Hygiene Service. Accordingly, a Division of Industrial Hygiene was added to the City Health Department last year.

With the establishment of this division, the Los Angeles City Health Department began its own program of industrial health promotion, based on the recommendations as outlined by the U. S. Public Health Service. Since these in turn, are based on health problems which are common not only to Los Angeles industry but to all industry, the Los Angeles program is essentially the same as the state program. Although the state service has a greater area to cover and greater diversity of industry to serve, the problems, the objectives and the methods used are fundamentally alike.

Thanks to the preliminary work done by Dr. Russell and his staff, it was unnecessary to do the spade work, which would otherwise be needed to determine the scope and nature of the industrial hygiene problem in Los Angeles. We could be reasonably sure that 75% of the establishments in this area employed less than 100 people and that half the working population was employed in small plants. It is a matter of record that plants of such small size cannot afford full-time medical service. In substantiation of this, none of the surveyed plants in Los Angeles had a full-time doctor at the time of the preliminary survey. Not even the larger plants had one, although for United States industry as a whole 20% of plants employing over 100 people had full-time medical service. Other health and medical provisions were similarly deficient, with nursing service available only in the larger plants. What were some of the other finds? It is well established now that non-occupational illness occurs 10 times as frequently as that which is occupational in origin. It would, therefore, appear logical to assume that industry would be interested in keeping records of sick absences, if only as an economic measure. But

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only 25% of workers were thus supervised. The other outstanding finding was the small proportion of workers that received physical examination before employment. Less than half of the workers received such service and only half that number received periodic subsequent examinations. The findings might be summed up by saying that the large majority of plants in Los Angeles were of a size too small to provide even elementary medical service, a fact which was substantiated by the number of workers for whom health and medical services were unavailable.

The preliminary work also disclosed the most frequently occurring potential hazards such as dermatitis producers, dusts of all kinds, carbon monoxide and other gases, organic solvents, lead and its compounds and many others. Also revealed were those industries in which the greatest number of hazards could be expected.

Thus, a fairly clear picture of the industrial health needs of the community was available. Our program was, therefore, initiated by making surveys and studies of actual plant conditions capable of causing industrial diseases. This part of our program is still continued and a survey of a plant includes medical and engineering investigation with laboratory analysis where necessary.

Depending upon what our preliminary investigation discloses, air samples may be taken for counting or analyzing dusts or other harmful contaminants likely to cause occupational diseases. In some instances as in the case of certain toxic gases or vapors, quantitative determinations of grab samples may be made on the premises by means of instruments designed to give instantaneous readings. In other instances, samples obtained by various methods are taken to the health department laboratory for quantitative analysis. Where the analysis involves procedures which have not been previously utilized in our laboratory, duplicate samples are sent to the laboratory of the State Industrial Hygiene Service as a control on the accuracy of our work. Besides air sampling, studies are made of defective illumination and ventilation, and of toxic materials and products. Medical examinations for evaluation of the degree of a hazard are made where necessary. Advice and recommendations are then given for control of any occupational hazards found.

When we first started our program, our visits were self-initiated and directed to those plants and industries where preliminary surveys showed hazards or exposure to toxic materials might be anticipated. Later, as relations were established with other agencies, and as our work came to be known, we began to receive referrals or requests for service from various sources.

At the present time we receive requests for investigation of industrial hazards from management, labor organizations, insurance carriers, and from official agencies. These include the State Industrial Hygiene Service, which may refer a request received by them from our jurisdiction, and the local office of the Industrial Accident Commission, which may request a study to evaluate certain hazards encountered in their investigations. Finally, by arrangement with Dr. Russell, we receive copies of reports of occupational diseases originating in Los Angeles of which certain ones are selected for follow-up investigation in the plants where they occurred.

Inasmuch as such occupational disease reports are a live index of health conditions in various industries, it is unfortunate that we do not receive such reports directly from the plants at the time the reported cases occur. As it is at present, by the time the report reaches Dr. Russell and a copy from him is received in our office, a considerable interval of time elapses. It is hoped that as our work becomes better known some arrangement may be made with the industrial medical profession in Los Angeles whereby a summary report of an occupational disease would be sent or phoned directly to us. Such a report need only contain the worker's name and address, his place of work, the medical diagnosis and probable cause of his illness. Direct reporting of this sort would permit the immediate follow up of serious occupational illness, as happened in a case of poisoning by toxic metal fumes which occurred recently. In this instance, the case was reported informally by Dr. R. T. Johnstone shortly after it came to his attention. As a result we were able to follow up this case immediately and succeed in having the operation responsible for its occurrence discontinued, although we haven't yet received our duplicate report of this case from Dr. Russell's office.

Bearing in mind our program as I have described it so far, it has become possible for us to act as a source of information on industrial health for organizations in our area. We are in a position to furnish data and information regarding toxic substances and operations to all those who are interested in industrial hygiene. The interested groups are usually the ones from whom we receive requests for investigations or surveys. Dissemination of information of this sort in turn leads to certain educational and promotional activities. The educational activities take the form of literature and lectures to plant personnel and labor groups concerning the hazards and hygiene of their occupation. The worker must understand the reason he should cooperate in controlling the hazards, and he only cooperates if he knows the significance of the material he handles and why protective equipment is necessary even though it may be annoying, or uncomfortable. The uncooperative worker usually signifies lack of information on his part or protective equipment which is ineffective or poorly cared for. Similarly, the management must be educated regarding the toxicity or harmfulness of products so that they may understand the necessity for engineering corrections and control of those hazards.

Since industrial hygiene is not limited to prevention of occupational diseases, but also seeks to promote the health and prolong the life of the worker, our program includes certain promotional

aspects. Therefore, we attempt to educate the management to realize that although control measures for specific hazards will prevent disease, a program of positive health is an economic investment which brings increased efficiency and increased production. The plant that improves the physical working environment and provides decent facilities for workers' hygienic needs indicates an interest in promoting the health of the worker, creates better personnel relationships, and decreases labor turnover. We are also attempting to interest plant managements in periodic physical examinations of employees and the utilization of their industrial physicians for preventive and public health purposes as well as for treatment of injuries. Which brings me to another aspect of the promotional phase of our program.

If industry is to cooperate in establishing industrial health programs, it will need medical men who can direct those programs. It has been my observation that with a few exceptions most industrial physicians and surgeons limit their work to therapy of trauma. At least that is true in Los Angeles. Although one plant that I visited now has a full time doctor, that doctor told me he had never made a complete tour of his plant to observe occupational hazards or the working environment. With few exceptions, most industrial doctors in Los Angeles have their offices at strategic points where industries are grouped. The ready accessibility of these physicians may very well be the reason why some of these industrial establishments have not even a part time doctor of their own. This seems to me to work to the disadvantage of both the neighborhood physician and the industries near his office. These doctors have many hours weekly when they see no one. And the industries around their offices have many opportunities for medical service other than for care of injuries. Our program includes as one of its projects the bringing together of these industries and these doctors on a more intimate basis. Certainly many plants that now have none could advantageously use a doctor at regular periods, once or twice a week. Conversely there must be some doctors who would be glad to have a clientele of nearby industrial establishments in which definite days and hours could be scheduled at regular intervals. It would mean, however, that the industrial medical men would have to become more interested in the preventive aspects of industrial health. It would also mean that industrial doctors would have to get better acquainted with processes and materials in the plants where their patients work.

Granting that not all plants are able to maintain a physician, many should be able to use full time or part time nursing service. Our program includes the stimulation of interest among public health and other nurses in the opportunities for industrial nursing. Similarly, we are interested in making industry aware of the benefits which industrial nursing could achieve in improved health and efficiency of workers.

Finally, realizing that industrial hygiene must consider the influences on the workers' health beyond that which he encounters at work, we have enlisted the cooperation of other divisions of our health department for extending general public health services. Our City Health Department nurses, our Tuberculosis Division, our Bureau of Housing and Sanitation, and others in the department, are all alert to any conditions which may be related to industrial hygiene. These may include special supervision of food establishments where workers eat, or reporting cases of illness encountered, possibly arising out of occupation and which may need investigation by our division. On the other hand, we are cooperating with them in the promotion of various individualized programs of public health, as in venereal disease or tuberculosis case finding campaigns.

Although our program is for the benefit of all Los Angeles industries, and all the workers, certain selected industries must necessarily receive greater attention. These include the plants and establishments which have been forced by pressure of defense contracts to increase their personnel, their volume of production and materials handled. In many instances, the expansion of these industries has entailed the introduction of new methods of operation and of new materials about the hazards of which the management is not informed, and for which control measures are not adequate. Since defense needs require continued production without unnecessary interruptions from preventable illnesses, greater attention is given at this time to defense industries. Our program is especially directed toward preventing illness and maintaining health of workers in these industries, by the methods previously disclosed and approved by the State and U. S. Public Health Service.

In closing, a few more words may be said about our relationship with other agencies. Although we cooperate with other agencies which have powers of enforcement and respond to their requests for industrial health surveys, we ourselves do not exercise police power in the enforcement of our recommendations. We feel that our program is an educational one rather than regulatory. If our work is to be effective, it must be on a basis of voluntary cooperation of labor and industry arising out of education and understanding. Therefore, our written recommendations for corrections or control of hazards are supplemented by personal interviews and conferences with plant officials. We attempt to point out that where recommendations are complied with production efficiency is increased by the improved health and well-being of the worker as well as through improved relations between the worker and the management. In extreme cases where conditions are dangerous to health and where the management is recalcitrant, authority could be invoked to compel correction of hazardous work conditions. To date, we have not required the use of such drastic measures, and we won't if there is a chance to avoid them. Our division is a fact-finding, educational unit of the Health Department.

As I have already mentioned earlier, the similarity of most of our problems to those of the state requires methods and programs of industrial hygiene very much like those of the State Industrial Hygiene Service, except on a much smaller scale. As a matter of fact, our programs are coordinated in so far as our jurisdictional differences allow.

If the industrial medical profession and managements can cooperate as constructively as the State and City Industrial Hygiene units do, then the common goal of good health in industry will be reached jointly by all of us.

The Primary Care of Traumatic Wounds

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THE care of traumatic wounds has received frequent and extensive literary consideration during the last few years. In spite of this the incidence of poor results remains much higher than necessary. The infections causing these unsatisfactory results occur mainly from the failure to realize the importance of early adequate care of the wound.

I do not plan on covering the entire field of the treatment of traumatic wounds in this paper. However, I do propose to review the development and progress in the care of traumatic wounds, discuss the importance of immediate care, describe the technique used and report the end results from a study of cases so treated during the first six hours following the injury (Table 1). Cases treated later than six hours have been omitted because here we wish to show that the only successful treatment is early treatment.

The development of surgery of open wounds probably had its origin with Ambrose Pare, the father of modern surgery. Much can still be learned from his statement, "I dress the wound; the Lord heals it." Very little progress was made from that time until the development of aseptic surgery by Lister. The next epoch-making change came during the World War of 1914-1918. At this time the debridement was revived and its value proved. Following this, Orr developed his treatment for compound fractures. However, not until several years later did the medical profession as a whole realize the importance of thoroughly cleansing the wound and preventing further contamination by air and droplet borne bacteria. To Koch and his associates[1,2] should go credit for their work in demonstrating that the serious problem in handling traumatic wounds is not from the implantation of bacteria at the time of the injury, but from secondary contamination with human bacteria while the wound is being prepared and dressed. They demonstrated that the human borne bacteria have already acclimated themselves to the environment. Therefore, they begin an immediate invasion of the tissues, while those entering the wound at the time of its infliction have to adapt themselves to this new environment, and the process requires several hours time. Wounds caused by human bites and scratches where the infection begins immediately demonstrate this principle.

CARE of an open wound should begin immediately after its occurrence. The first aid should be limited to the control of the bleeding, application of a clean dressing and immobilization of the part. Hemorrhage should be controlled by a pressure bandage or tourniquet. The employment of a tourniquet implies its release every 20 minutes in order to prevent ischemia of the tissues. Absolutely no antiseptics should be placed in the wound. The exposed fragments of a compound fracture should not be disturbed; instead they should be covered with a dressing and splints applied with the fragments in the same position in which one finds them. The author makes a practice of instructing those who administer first aid in industrial accidents to follow this simple procedure. The patient is taken to the hospital promptly. The extent of the injury is determined by establishing the presence or loss of function in the affected area. This can be done without disturbing the wound. Institution of treatment immediately follows completion of the examination. If shock is present, measures to combat it are begun the instant the patient is seen. Treatment of the wound should be postponed only long enough to accomplish this.

The technique employed by the author is as follows: The operator prepares himself by applying a mask over the mouth and nose and wearing a cap. The hands are washed for 10 minutes with soap and water, after which sterile gloves are applied. Under regional or general anesthesia, a blood pressure tourniquet is applied if the injury has involved an extremity. The bandage is then removed but not the dressing directly over the wound. The surrounding area is shaved and then gently washed with soap and water to cleanse it thoroughly. This cleansing should include an area wide enough to allow free access to the wound. The wound itself is then washed very gently but thoroughly with soap and water and irrigated with a large quantity of water. The author has found that the simplest and most efficient method of irrigating the wound is to place the part under a small, low pressure stream of lukewarm water from the tap. The operator then changes gown and gloves and proceeds to drape the wound as for any surgical procedure. A debridement is carried out. This should be as complete as possible without destroying any vital structures. In the puncture type of wound, the opening is enlarged and the same technique followed. In the case of compound fractures the contaminated ends are thoroughly debrided. All contaminated and nonviable tissue should be removed but care should be taken not to injure or remove any of the viable tissue. Non-viable tissue left in the wound affords an ideal culture medium for the

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growth of any bacteria which may have been left behind. After performing the debridement, the wound is again irrigated, this time with warm sterile normal saline. One then inspects the wound thoroughly to determine the full extent of all tissue damage. Tendons and nerves are sutured. It should be noted here, that the best result from delayed suturing of these structures is seldom so good as that obtained by proper care immediately after the injury. The tourniquet is released and all bleeding controlled. The wound is then closed by layers with care being exercised not to apply tension to any of the sutures. Drains are avoided because they offer an avenue for the entrance of bacteria. If the tissue loss has been great enough to prevent closure of the deeper and subcutaneous layer, the wound is left open and packed with plain gauze. The change from vaseline gauze to the plain has been prompted by reports on the handling of a large number of extensive wounds in the recent Spanish and present European wars.[3] The results have been extremely satisfactory. When the deep tissues can be approximated, but a skin defect remains, an immediate skin transplant is made. The one exception to this procedure is the badly contused wound. In such a case, skin grafting is postponed until a healthy granulating surface appears. The wound is then carefully dressed and immobilized in a splint. The only case in which the splint is omitted is the small superficial wound and not even then if it is in a location where motion will produce irritation. The author feels that prompt healing demands absolute rest of the injured tissues. The wound is not disturbed for at least a week unless signs of infection develop. In the presence of nerve and tendon injuries, the splints are allowed to remain for three weeks. The care of compound fractures will be omitted since it is being discussed in another presentation at this meeting.

The discussion of the care of traumatic wounds would not be complete without a consideration of the various medicines and medicated dressings which have been advocated. The use of antiseptics will be mentioned only to condemn them. Their escharotic action reproduces the exact condition which has been relieved by debridement. The non-viable tissue produced by them affords an excellent culture medium for bacteria. Antitetanic and anti-gas serums have a definite value in certain wounds, although just when their use is indicated cannot be stated formally. A general suggestion is to use them when in doubt. The various types of medicated dressings have been of little value in the author's experience. One feels that such dressings are unnecessary if the wound has been adequately cleansed. However, Kreuscher[4] recently reported excellent results with the use of moist dressings of Carrel-Dakin solution. The use of the sulfanilamide compounds, both locally and systemically, has been discused extensively during the last few years. The experimental work of Jensen, Johnsrud and Nelson[5] showed that the local implantation of sulfanilamide had a definite value in the prevention of in-

TABLE I.

TYPE OF INJURY AND GENERAL RESULTS
(247 Consecutive Cases)

Type of Injury	No. Cases	Infection (cases)	Time Loss (days)	Healing Period (days) 0-0	7-14	14-21	Over 21
Incised and lacerated wounds	183	2	65 average 0.353	153	22	4	4
Puncture wounds	33	0	19 average .575	30	3	0	0
Compound fractures	25	0	588 average 23.52	13	7	5	
Tendon and nerve injury	6	0	60 average 10	4	2		
Total	247	2 0.84%	732 average 2.96*	200	34	9	4

* Average loss of time, exclusive of compound fractures, was .69 days.

TABLE II.

INCISED AND LACERATED WOUNDS
ANALYSIS AND EFFECT OF LOCAL MEDICATION (Sulfanilamide)

Cases	Infection (cases)	Time Loss (days)	Healing Period (days) 0-7	7-14	14-21	Over 21
No medication 166	2	34 average 0.2	140	20	3	3
Sulfanilamide 17	0	31 average 1.82	13	2	1	1
Total 183*	2**	65 average 0.355	153	22	4	4

* 54 of these were crushing injuries with tissue loss. The healing period in these cases was as follows: 0-7 days 27; 7-14 days 19; 14-21 days 3; over 21 days 4.

** Infection locally only, healing complete in 12 and 14 days.

TABLE III.

PUNCTURE WOUNDS

ANALYSIS AND EFFECT OF LOCAL MEDICATION (Neoprontosil)

Cases	Infection (cases)	Time Loss (days)	Healing Period (days) 0-7	7-14	14-21	Over 21
No medication 22	0	5 average 0.277	21	1	0	0
Neoprontosil 11	0	14 average 1.27	9	2	0	0
Total 33	0	average 0.575	30	3	0	0

TABLE IV

COMPOUND FRACTURES

ANALYSIS AND EFFECT OF LOCAL MEDICATION (Sulfanilamide)

Cases	Infection	Time Loss (days)	Healing Period (days) 0-7	7-14	14-21	Over 21
No medication 23	0	578 average 25.13	13	6	4	0
Sulfanilamide		10				
Total 25	0	588 average 23.52	13	7	5	0

TABLE V.

TENDON AND NERVE INJURIES

ANALYSIS AND EFFECT OF LOCAL MEDICATION (Sulfanilamide)

Cases	Infection	Time Loss (days)	Healing Period (days) 0-7	7-14	14-21	Over 21
No medication 4	0	25 average 6.25	2	2	0	0
Sulfanilamide 2	0	35 average 17.5	2		0	0
Total 6	0	60 average 10	4	2	0	0

fection while the systemic effect was very slight. Key and Burford,[6] Johnson,[7] Brylski,[8] Stuck, Maxwell and Monsalva,[9] Knowles,[10] and others have also demonstrated the value of its clinical use in these cases. It should be noted here, however, that the drug when applied locally in infected wounds has practically no therapeutic value. The explanation has been that the necrotic tissue and split proteins inhibit the action of the drug.[11] For the last three years the author has injected the tissues surrounding puncture wounds with neoprontosil, and for the last six months has implanted sulfanilamide locally in a selected number of lacerations and compound fractures (Tables II, III and IV) without an infection. The number of cases is too small to be of statistical value, but here again one feels that such medication is not necessary if the wound preparation has been thorough. The possible exception is the stasis effect on anaerobic organisms.

Two hundred and forty-seven consecutive cases have been treated primarily by the technique herein described. All of these cases were seen during the first six hours and 95% during the first two hours. Only the cases were included in which the wound extended completely through the skin, thus eliminating all abrasions and burns. All of the cases were followed through to the completion of the healing process and the results tabulated. The types of injuries encountered are shown in Table I. It will be noted that two incidents of infection occurred and that these took place in simple lacerations. The infection was limited to the wound surface in both instances and it promptly subsided. The period required for complete healing was only 12 to 14 days respectively. The time loss for the entire series was 2.96 days including the 25 compound fractures. If one includes only those cases in which the loss of time was due to soft tissue injury, the average loss would be .69 days. Two hundred of the cases had completely healed by the end of the first week, and an additional 34 by the end of the second week. This leaves only 13 wounds which had not completely healed during the first two weeks. In every one of these cases the slowness of the healing process could be explained on the basis of tissue loss at the time of the injury.

Summary and Conclusion

THE value of adequate, early care for all traumatic wounds has been stressed.

2. A technique has been outlined for adequately treating all open wounds. The results obtained definitely warrant the meticulous care which has been outlined.

3. A series of 247 consecutive cases has been presented, all of which were treated early. The incidence of infection was only 0.84%. This infection was of a mild type, being limited to the wound surface.

4. The effect of the local use of the sulfanilamide compounds in the prevention of infection has been discussed, and results have been presented of its use in a small series of cases. While one feels that it has some value in this field, more data will be necessary before any conclusion can be made.

Bibliography:

1. MASON, M. L., and KOCH, S. L.: Human Bite Infection of the Hand with a Study of Routes of Extension of Infection. *Surg. Gynec. & Obst.*, 591-625 (Nov.) 1930.

2. KANAVEL, A. B., and KOCH, S. L.: The Treatment of Infected Wounds on a Surgical Service. *Bull. Am. College of Surgeons*, 14: 19-27 (Sept.) 1930.

3. TRAETA, J.: Treatment of War Wounds and Fractures. Paul B. Hoeber, New York, 1940.

4. KREUSCHER, P. H.: The Treatment of Fresh Wounds. *Am. J. Surg.*, 583 (March) 1941.

5. JENSEN, N. K., JOHNSRUD, L. W., and NELSON, M. C.: The Local Implantation of Sulfanilamide in Compound Fractures. *Surgery*, 6: 1 (July) 1939.

6. KEY, J. A., and BURFORD, T. H.: Local Implantation of Sulfanilamide in Compound Fractures—its effect on healing. *Southern Med. J.*, 33: 449-453 (May) 1940.

7. JOHNSON, R. W.: Chemotherapy in the Prevention of Infection in Compound Fractures. *Am. J. Surg.*, 50: 195-200 (July) 1940.

8. BRYLSKI, F. J.: Prontylin and Neoprontosil — their use in industry. *Indust. Med.*, 8: 469-472 (Nov.) 1939.

9. STUCK, W. G., MAXWELL, E. A., MONSALVO, R. N. O.: *Texas State J. Med.*, 36: 225-228 (July) 1940.

10. KNOWLES, F. W.: Personal Communication.

11. LOCKWOOD, J. S.: Observations on the Mode of Action of Sulfanilamide. *Trans. Am. Surg. Assoc.*, 56: 318-324, 1938.

A Survey of Non-Occupational Injuries and Illnesses

—*In a Major Carpet Mill for 1940*—

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THIS study has been made to determine the amount of time lost due to non-occupational injuries and illnesses. It has further been analyzed to find out the leading causes of such lost time.

For many years, it has been possible to determine frequency and severity rates by lost time data of industrial accidents, because adequate and complete records have been kept.

This is not true of non-industrial injuries and illnesses for the most part. Three and one half years ago (July, 1937) a group life, accident and sickness policy was bought with an outstanding insurance company. Their records of claim were available for this study. Two years ago, a month of hospitalization was added to the group coverage. It must be remembered that the policy is a voluntary one and protects about 80% of the employees. Therefore, records of illnesses of 20% of employees are not available and not included in this report. Injuries and illnesses entailing lost time of one week's duration or less are not covered by the policy and not included in the data. Days lost were in the year 1940, some of the claims began in 1939 and some will run into 1941. Actual working days (five days per week) only were counted, so an analogy could be made with industrial accidents.

Table I shows non-occupational injuries and sicknesses account for five times as much lost time as occupational injuries in this one carpet mill.

TABLE I.

A. Total number of claims for 1940	312	
Female	111	
Male	172	
Pregnancies*	29	
Home cases	176	
Hospital cases	93	
Deaths	17	
Total number of attending physicians	80	
Total days lost	8722	
Total sickness benefits	$21,275.68	
Hospital benefits	$ 3,228.25	
Death claims	$19,001.33	
Total benefits		$43,505.26
B. Total number insured	2362	
Female (29%)	685	
Male (71%)	1677	
C. Total occupational injuries (1940)	2586	
Lost time cases	31	
Total days lost	1742	
D. Total number of employees	2922	
Female (30%)	860	
Male (70%)	2062	

* 6 weeks benefits allowed; this lost time is not included in the data.

Table II shows classification of 283 claims, not including pregnancy cases. In this table we attempted to classify as much as possible by system diseases. The first group is called non-occupational injuries and infections, which includes some arthritics, neuritics, etc., which could have been further classified under locomotor system diseases. If this were done, the group would still be the main cause of lost time. Also in this group are possibly one dozen automobile accident cases; data are not exact in this respect. Depending what is included in each classification determines the % in each group and % of days lost, yet this appeared the only logical way to classify them.

The first five groups comprise about 80% of days lost, so a further analysis of each system was performed.

TABLE II.

	No. of Claims	Male	Female	Disability Classification	Days Lost	Male	Female	% of Total Days Lost
1.	85	60	25	Non-occup. inj. and infection	2474	1870	604	27.5
2.	48	33	15	Gastro-intestinal system	1754	1227	527	20.
3.	58	27	31	Respiratory system	1072	535	537	12.3
4.	24	6	18	Genito-urinary system	954	99	855	10.9
5.	27	24	3	Cardiac and circulatory	914	849	65	10.4
6.	7	2	5	Infectious diseases	386	140	246	
7.	8	1	7	Blood diseases	313	64	249	
8.	7	7	0	Herniae	258	258	0	
9.	5	3	2	Mental diseases	236	96	140	
10.	4	3	1	Eye disease	184	113	71	
11.	5	1	4	Skin diseases	81	29	52	
12.	3	3	0	Ear diseases	34	34	0	
13.	1	1	0	Diabetes mellitus	32	32	0	
14.	1	1	0	Paralysis agitans	30	30	0	
TOTAL	283	172	111		8722	5376	3346	
						62%	38%	

TABLE III.

NON-OCCUPATIONAL INJURIES AND INFECTIONS

			Male	Female	Days Lost Male	Days Lost Female	Total Days Lost
	Ribs	2					
	radius	5					
	phalanges						
15	pelvis	2	11	4	579	100	679
Fractures	nose	1					
	tibia	4					
	Sciatica	3					
	arthritis	7					
17	neuritis	3	12	5	387	201	588
	lumbago	3					
	myalgia	1					
	Sacro-iliac	5					
	hip	1					
16	knee	3					
Sprains	ankle	5	11	5	267	61	328
	shoulder	1					
	toe	1					
12	Infections		8	4	148	63	211
2	knee	1					
Dislocations	shoulder	1	2	–	142	—	142
3	bursitis		2	1	49	63	112
7	Contusions to head and body		5	2	70	25	95
3	Ulcers of leg		2	1	32	33	65
2	Cerebral concussion		2	–	63	—	63
1	Traumatic kidney hem.		1	–	45	—	45
2	Burns		1	1	20	17	37
1	Punctured lung		1	–	35	—	35
1	Paralysis of thumb		–	1	—	26	26
1	Cellulitis of leg		1	–	22	—	22
1	Laceration of face		–	1	—	15	15
1	Inflammation of hip		1	–	11	—	11
85			60	25	1870	604	2474

In the gastro-intestinal diseases (Table IV) we have placed appendicitis and rectal diseases, main causes of absence.

TABLE IV.

	No.	Male	Female	Days Lost	Male	Female
Appendicitis	12	7	5	402	223	179
Rectal diseases	15	12	3	398	299	99
Gastro-enteritis	6	2	4	204	91	113
Carcinoma of colon	1	1	–	227	227	—
Intestinal grippe	2	2	–	145	145	—
Gastric ulcer	3	3	–	69	69	—
Gastritis and hepatitis	2	2	–	69	69	—
Colitis	1	–	1	62	—	62
Epigastric pains	1	1	–	42	42	—
Gastric hyperacidity	1	–	1	39	—	39
Irritable colon	1	–	1	35	—	35
Nervous indigestion	1	1	–	29	29	—
Intestinal obstruction	1	1	–	17	17	—
Duodenal ulcer	1	1	–	16	16	—
Total	48	33	15	1754	1227	527

In this group (Table VI) 90% of days lost is due exclusively to diseases of female organs.

TABLE VI.

	Genito-Urinary					
	No.	Female	Male	Days Lost	Male	Female
Ovarian cyst	2	–	2	162	—	162
Fibroid of uterus	2	–	2	102	—	102
Renal colic	5	4	1	99	49	50
Leukorrhea	1	–	1	95	—	95
P. i. d.	2	–	2	89	—	89
Cervical polyps	2	–	2	88	—	88
Endocervicitis	2	–	2	87	—	87
Uterine prolapse	1	–	1	62	—	62
Bartholin abscess	1	–	1	45	—	45
Hysterectomy	1	–	1	39	—	39
Cystitis	1	1	–	37	37	—
Abortion	2	–	2	31	—	31
Phimosis	1	1	–	13	13	—
Nephroptosis	1	–	1	5	—	5
Total	24	6	18	954	99	855

In the group in Table V we placed tonsillectomy, the fourth cause of diseases of respiratory system.

TABLE V.

	No.	Male	Female	Days Lost	Male	Female
Grippe	14	4	10	194	78	116
Broncho-pneumonia	3	3	–	153	153	—
Upper respiratory infection	4	1	3	130	20	110
Tonsillectomy	10	6	4	121	65	56
Acute tonsilitis	8	5	3	113	54	59
Grippe and bronchitis	5	3	2	83	43	40
Grippe and strept. sore throat	2	–	2	54	—	54
Acute bronchitis	4	1	3	44	9	35
Influenza	2	–	2	35	—	35
Post nasal infection	1	1	–	35	35	—
Pleurisy	1	1	–	34	34	—
Lobar pneumonia	1	1	–	32	32	—
Hay fever	1	–	1	21	—	21
Strept. throat	1	1	–	12	12	—
Sinusitis	1	–	1	11	—	11
Total	58	27	31	1072	535	537

In this group (Table VII) 50% of lost time is due to actual cardiac conditions.

TABLE VII.

	Cardiac and Circulatory System					
	No.	Male	Female	Days Lost	Male	Female
Cerebral hemorrhage	2	2	–	277	277	—
Cardiac failure	6	5	1	190	189	1
Myocarditis	5	5	–	156	156	—
Hypertension	2	1	1	49	21	28
Phlebitis	1	–	1	36	—	36
Arteriosclerotic disease	1	1	–	36	36	—
Cerebral thrombosis	2	2	–	20	20	—
Coronary occlusion	3	3	–	20	20	—
Epistaxis	1	1	–	10	10	—
Valvular heart disease	1	1	–	7	7	—
Total	27	24	3	914	849	65

Discussion

THE main conclusion from these tables and data is that non-industrial sicknesses and injuries account for much more absenteeism in this plant than occupational injury. Non-occupational injury and infection group and gastro-intestinal diseases each account for more lost time than industrial accidents.

In the non-occupational injury group, fractures, sprains and arthritic neuritic cases are the main causes of the most lost time and disability.

In the gastro-intestinal group, appendicitis is the leading cause of lost time, closely followed by rectal diseases and gastro-enteritis.

In the respiratory system group, grippe, bronchopneumonia, upper respiratory infections (colds) tonsillectomy and tonsillitis lead the list.

In the genito-urinary group 90% of the days lost are due exclusively to pelvic diseases.

In the circulatory system group, cerebral hemorrhage is in first place, followed by cardiac lesions.

We examined a few claims that bore only symptoms rather than diagnosis. We think that the insurance company should demand diagnosis from the doctors before claim is granted. Of course, we have no method of checking on the physician's diagnosis, we do believe them substantially correct. We did examine practically every one of these patients when they returned to work.

We were surprised to learn that 80 different doctors attended these cases, as this is a small community which has but 12 M. D.'s. Yet hospitalization is in a large city eight miles distant which of course has several hundred physicians.

It must be kept in mind that days lost due to industrial causes is 100% of lost time and employees, whereas group sickness claims represent but 80% of employees. The rest of the tables are self explanatory.

Ten individuals had two claims for sickness and two individuals had three claims for sickness in the year 1940.

Conclusion:

AN analysis from insurance claims is presented with actual days lost being charged to each systemic classification.

Approximately one in every 10 insured males, submitted a claim for sickness or injury in the year 1940; one in every five females (including pregnancies) submitted a claim.

Sixty-two per cent of the time lost by non-occupational injuries and infections was by males, who held 71% of the policies; 38% of the time lost was by women, who owned but 29% of the policies.

This study confirms the fact that non-occupational injuries and sicknesses account for more absenteeism in this industry than occupational injuries and diseases. It also shows that non-occupational injuries and diseases of gastro-intestinal, respiratory, genito-urinary and circulatory systems respectively are the main causes of such absenteeism.

Evaluation of Compensation Injuries

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WHEN I was invited to speak for not more than 18 minutes on the subject of "Compensation Evaluation," I felt that I was in much the position of a man who, faced with the necessity of writing a brief biography, reduced it to the simple but comprehensive formula: "He was born, took a wife, and died." Unfortunately, while no one can criticize this author's lack of conciseness, it must be admitted that there is a certain loss of interesting detail and of character. To keep within the prescribed limits imposed by the brief time at my disposal and yet leave some meat in the discussion, I shall limit myself to a brief exposition of the general basis of industrial compensation, and its practical application by the physician.

It must be admitted that compensation laws differ widely not only in different countries but also in different states within our own country, even in adjoining states, and that such differences are also to be noted with varying administrative interpretations of the law. Under the broadest interpretation, compensation is to make good a part of the loss of earning power and so may be continued throughout the industrial life of the injured. Theoretically, this may seem both humane and fair, but in practice it proves far from desirable. It calls for examinations and re-examinations, and so fosters neuroses and malingering. An ever mounting army seeks not recovery and normal employment, but instead tries to capitalize through increased compensation on disability and unemployment.

There is another basic difference in the compensation laws of different states; they may provide for the determination of permanent disability after temporary disability has ceased, the permanent disability to date back to the time of injury, thus running concurrently, or the permanent disability may be reckoned from the date of termination of the temporary disability. In theory, the law which provides for permanent disability after, and in addition to the time required for recovery appears fairer, since, obviously, the allowance for temporary disability may exceed the award provided for a given permanent disability, particularly in the case of minor injuries. In practice, however, it is often found that temporary disability is indefinitely prolonged when the injured lacks the incentive to get well. It is obvious that the workman accustomed to heavy work and forced by injury to lead a sedentary life for any considerable period of time, will find it hard to resume his customary work, and the longer the period of enforced idleness, the older the injured, the harder it will be. After a few hours or a few

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days, he may refuse to continue with his work insisting that he is still disabled. Rarely this may be the case; in other rare instances, it may be a case of malingering, but in a majority of instances, his apparent disability is due to the fact that he has again become a "rookie." Enforced idleness has meant the loss of his usual endurance, has temporarily lessened his aptitude, and has sometimes weakened his morale. Further prolonging idleness will increase rather than decrease his complaints when he again attempts work. Given a cooperative employer and an honest workman the difficulty is readily adjusted by a gradual return to heavy duties. Lacking the employer's will or ability to make such an arrangement, an attempt should be made to explain to the workman the reason for, and the transient nature of his discomfort, and thus to restore his morale. If he is obdurate and uncooperative, cutting off compensation is the only cure. Here the concurrent running of temporary and permanent disability beyond recovery is at the expense of the injured. Where there is prolonged temporary disability, the concurrent running of temporary and permanent may result in an unfortunate loss to the injured. At best, we can only hold that this world gives no guarantee of equality of the fortunes and misfortunes dealt us by fate, and so consider this a hardship rather than an injustice.

MENTAL and financial factors both play an important part in the duration and degree of disability. In my own experience, I have found deliberate and conscious malingering not unknown but relatively rare. Moreover, it is not for the most part as difficult to detect malingering as one might anticipate. For one thing, the average workman does not have sufficient knowledge of pathology and symptomatology to deceive an examiner who is careful and is on guard. There is a possible exception in inguinal hernia. Such hernias are very prevalent, particularly among workers who have been engaged in heavy work for sometime. In the vast majority of cases, such hernias are rather an industrial disease than a traumatic one, having developed gradually over a long period on the basis of congenitally enlarged rings. Nevertheless, hernia of this type has so long been attributed to strain of some sort, that there are probably few workmen who are not more or less familiar with the type of accident which is usually held responsible for its development. Slipping while carrying a weight, being subjected to sudden strain when a fellow worker suddenly looses his hold on some heavy object which the alleged injured was helping carry, and a wide variation of these themes are the usual scapegoats. True traumatic hernia, in which hernia develops as the result of direct violence at the site of the herniation is rare, and obviously would come under the early observation of a physician. When a hernia of gradual development is first noted following some certain effort, we find the case more difficult of adjudication. If the hernia was of sudden development, i.e., developed during or immediately after some unusual strain, it is again probable, to say the least, that the worker would experience sufficient pain and concern so that he would give up his work, at least temporarily, and would consult a physician in these days of compensation and free medical care. At this early stage, the physician should be able to find some confirmatory evidence. In the event this is found, and even in certain very doubtful cases, there has been a rather widespread custom of authorizing operation and a limited period of time for convalescence.

I have said that frank malingering is rare; unfortunately, so-called traumatic or compensation neurosis is not. Neuroses of this type may assume the most protean forms, and are more apt to develop following minor injuries than grave ones; they occur with far greater frequency during periods of seasonal unemployment or general financial depression than when workers are at a premium. The physician may encounter some difficulty in making the diagnosis of compensation neurosis because of its varied aspects, but he is usually eventually quite confident of his diagnosis. He encounters far greater difficulty when he attempts to sell the patient the idea that no organic disease is present and that he is not permanently disabled nor even gravely ill. Pain is unfortunately something which the physician cannot demonstrate, but the patient insists that he *feels* it, and when all is said and done, pain *may* be disabling. Moreover, the employer, who not infrequently lacks a true conception of the theory and function of compensation insurance, may be sympathetic and inclined to feel that since he is required to pay for compensation insurance anyway, his injured employees may as well secure the maximum benefit from it. While this attitude is a disservice to the workman with a compensation neurosis, it often places the insurance carrier in the unfortunate position of having to choose between an unfair settlement and a disgruntled policyholder. When conscious malingering can be ruled out, the best treatment in these cases is the gold cure in a single dose, the smaller the more effective. In other words, these patients continue to feel ill so long as the case remains unsettled, or as there remains a possibility of having it reopened. Only a final settlement can remove the basic etiologic factor — the unconscious desire for pecuniary profit. The closure of the case puts an end to the injured's preoccupation with himself and his fancied or exaggerated symptoms, and does away with the need for repeated examinations which but aggravate his condition.

UPON what basis is the award for any permanent disability made? In a general way, laws provide for anatomic loss, so much for the loss of an eye, so much for the loss of a given digit, and so forth, the actual sum based upon the earnings of the injured over a fixed period of time. I, for one, am glad that the basis for determination of compensation awards has been arbitrarily fixed. Who among us would be willing to part with the

sight of an eye, let us say, for any conceivable sum? Yet the matter of sympathy, of our own valuation of a given member does not, or should not enter into our evaluation of a certain injury. The insurance rate has been fixed by the experience of the casualty rate in a given industry upon the basis of the compensation for stated injuries as established by law. In the individual case, they often seem woefully inadequate, but it must be remembered that in many cases no recovery would have been possible under common law; that even when the awards were apparently larger under common law action, often little of the money actually reached the workman but was lost in court costs and attorneys' fees; that the present awards represent a compromise between what the worker believes right, and what the public, who in the final analysis pays the bill, can afford to pay.

The anatomical yardstick for loss of a given member is in practice a functional one. It is immaterial whether an arm has actually been lost; it is rather the use of the arm with which we are concerned. Under the laws of this state, it may be remarked in passing, there is no distinction made between the loss of the right and the left hand and, therefore, no consideration of whether the worker is right or left handed. Moreover, there is no occupational distinction made; the loss of the first phalanx of the first and second fingers of the right hand may constitute a major calamity in the case of a watchmaker, necessitating a change of occupation, let us say. Yet his compensation, except as his wage may have been greater, will be the same as that of the unskilled laborer who may be able to handle a spade after as well as he did before his injury. If the change of occupation means increased income as it sometimes does, for instance when the employer takes the man from the work bench and makes of him a salesman, this fact will obviously not lessen the amount of compensation due him.

Evaluation of the disability resulting from complete or partial ankylosis of a joint is one of the frequent problems facing the industrial surgeon. Various instruments for measuring accurately the range of motion of a joint have been suggested, but I believe that nothing can replace critical examination and good judgment. Often there is continued, gradual improvement in the use of the injured member, but it is rarely wise to postpone evaluation until it can be determined just how much function will be ultimately restored. So long as settlement is still pending, many workmen feel that the injured member is, so to speak, the property of the insurer, and so fail to cooperate; stubbornly insisting that to use it is impossible. Here early settlement of the case makes for the best therapeutic results, since, following such settlement, the workman again takes a proprietary interest in the injured member, is willing to endure discomfort, to make systematic efforts to increase its usefulness. From the insurer's standpoint, such early settlements probably cost no more than delayed ones, and physical results are usually better.

In the case of multiple injuries, it is better and simpler to base the evaluation on a percentage of total disability rather than to attempt to estimate the disability of each lesion separately. Theoretically, the final estimate will be pretty much the same, and, where this is not the case, I believe that the award based on consideration of total disability will be the fairer one. It is also a general rule that unusual injuries can best be measured by the total disability yardstick. To cite specific instances: ordinarily, partial ankylosis of the jaw, or scarring of the soft tissues of the face may not be considered compensable, but if the ankylosis is sufficient to cause interference with general nutrition, or if the scarring results in difficulty in securing re-employment in a former occupation, I believe that most industrial courts would consider the lesion compensable.

To attempt to summarize this brief summary would be to reduce it to much the proportions of the biography to which I have referred, so I shall close with a brief word on professional ethics in the evaluation of compensation disability, or, for that matter, in any phase of compensation work. The physician may dance to the private patient's tune, providing always that he has the time and the temperament that enables him to carry out such gyrations gracefully. Under compensation coverage, neither the patient's desire for unlimited attention nor the desire of the insurance company to keep professional and hospital fees to the minimum should determine the physician's attitude. The physician's one criterion must be how much and what care the injured requires to hasten recovery, to prevent permanent disability, and if the latter is inevitable, to keep it to the minimum. He represents not the insurer, the insured, not the injured, but the medical profession. This is the important thing to remember in the care of the patient and when the physician, in whatever capacity, is called upon to make a report for the injured or for the insurer, or to testify for either party before a court. He can not represent either party in any prejudiced sense, but only his profession; and so long as he answers questions without fear or favor, he cannot be maneuvered into an embarrassing position.

Chromium Poisoning

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WITH THE development of the National Defense program, chromium steels, which possess hardness and toughness, will be in an ever increasing demand. Hand in hand with this utilization of chromium alloys, the steel workers will experience affections of the upper respiratory passages, industrial skin diseases and irritation or ulceration of the lining of the nose and throat. This constitutes the chronic disease called chromium poisoning.

The war industries need armor plate and projectiles; parts of gun carriages, axles, springs, cutlery, etc. Steels that are highly resistant to abrasive action, need chromium in addition to other alloys such as manganese, tungsten, vanadium and nickel.

In the manufacture of high speed tools, an alloy containing chrominum, cobalt and tungsten is used. Cutlery is made from rustless steel which contains 13% to 14% chromium and 1% nickel. Conveyor chains and annealing boxes are made from an alloy containing 14% chromium, 15% iron and 60% nickel. Exhaust valves, turbine blades, roller bearings and pump rods are made of stainless steel which contains 13% chromium.

The ore used in the manufacture of stainless steel is obtained from South Africa, Turkey, Greece and the Philippines. The raw material is fed into the electric furnace by means of a floor type charger where the chromium, ferro-alloys, scrap iron and steel are subjected to the intensive heat of the electric arc. The molten metal is poured into a row of ingot molds with a ladle. The ingots are further subjected to a heating process in the furnace and then through a series of mills which reduces them to billet sizes. Next they are swung to the grinder department where the surface is ground to remove imperfections. The ground billets are further processed in various sized molds for marketing.

The primary source for stainless steel is chromite which is a blackish brown crystalline dust.

PROPERTIES OF CHROMIUM: Metallic chromium is crystalline and brittle, harder than glass. It melts at 1520° C. and boils at 2200° C. An alloy of 20% chromium and 80% nickel has the non-corrosive qualities of both metals. In industry, three metallurgical methods are used:

1. The production of ferro-chrome from the smelting of chromite.
2. The chemical treatment of chromite for the manufacture of chromates and bi-chromates.
3. The extraction of chromium oxide from chromite for the production of metallic chromium.

The metallurgical uses of chromium are the chrome steels already referred to. In the chemical industries the yellow, green and red chrome pigments are widely used. In the dye industry the soluble chromate and bi-chromates are used as mordants. They are also used in the tanning of chrome leathers and in the bleaching of fats and oils. Chromic acids and bi-chromates are also used in the ceramic industry to color pottery. Some of the recent commercial uses have been the coating of metals with chromium by the electrolytic process. It is being largely used for automobile finishings. Because of the wide use of chromium in many places, a great number of workers are naturally exposed to to the caustic action of chromic acid and its compounds. When a crack or abrasion of the skin comes in contact with the vapor, liquid or dust of the chromium compounds, an erosion takes place gradually. The parts most ferquently affected are the hands, arms and septum of the nose. A skin inflammation resembling eczema first appears, then blisters. Ulcerations of the septum of the nose or of the skin are of a very minute size and holes as large as 1 cm. to 2 cm. may occur. In recent years I have seen five cases of chromium poisoning which claimed compensation.

If the defense workers are to be protected from this new hazard, contact of chromium with the skin must be reduced or eliminated. The atmospheric contamination with chromium dust or vapor, should not exceed 1 mgm. in 10 cubic meters of air. The workmen should undergo periodic inspections by the industrial physician for chrome ulceration or dermatitis and when found so affected, they should be rotated to other employment. It is essential to install exhaust ventilation at the source of the chromium vapors or dust by the best engineering judgment.

Cleanliness of benches and tables is necessary. Proper boots, aprons and gloves should be used. An educational campaign should be instituted among workers for personal hygiene such as frequent washing of the hands and the use of showers. Every scratch or skin infection should be reported for prompt treatment.

Chromium poisoning does not produce any systemic effects, but the chrome holes and the dermatitis may be most annoying and disfiguring and entail serious economic losses. It behooves the industrial physician and health authorities to be on the lookout for this hazard which may assume enormous proportions in the wake of the development of the war industries.

Primary Thrombosis of the Axillary Vein

—Case Report—

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PRIMARY thrombosis of the axillary vein is an unusual although not a rare syndrome. It was first recognized as a clinical entity in 1884 by Von Schrotter,[1] but Paggi[2] found only 74 cases in a survey of the literature up to 1933. Since then excellent reviews of the subject have been made by Matas,[3] by Veal and McFetridge,[4] and more recently by Kaplan.[5] Because of the infrequency of the condition, however, it seems justifiable to report another case.

Case Report

A POLISH-AMERICAN male, J. J., aged 23, a boiler fireman, came to the outpatient department of the E. J. Meyer Memorial Hospital April 17, 1936. One week previous to admission he had felt moderate pain in the left antecubital fossa; the pain radiated up to the axilla and down to the wrist. The following morning he noted a hard swelling of the left hand and forearm. Hot

fomentations relieved the pain, but during the next three days the swelling increased and extended up the left arm. The patient had been unemployed for six months, and there was no history of illness, accident, or even minute trauma preceding the onset of the present illness. He is righthanded. He recalled having had a mild cellulitis of the left wrist following a minor injury in 1932. Venereal infection was denied. Tobacco and alcohol were used in moderation. The past history and functional inquiry otherwise were non-contributory.

Physical Examination: The patient was a robust white male 23 years of age. Except for a ragged right tonsil and stained teeth, the abnormal findings were limited to the left upper extremity.

Fig. 1. Infra-red photograph April, 1936, showing swelling of the left arm and hand and dilated superficial veins on the affected side

This presented a hard, painless, non-inflammatory uniform swelling which included the hand, forearm, arm, anterior part of the shoulder, and the adjacent anterior chest wall. The swelling did not pit on pressure. There was a dilatation of the superficial veins (Fig. 1) along the inner aspect of the arm and on the upper left chest anteriorly. The veins converged toward the deltopectoral groove. In the axilla was a hard, slightly tender thick cord corresponding to the position of the axillary and brachial veins. Roentgenological studies of the neck, thorax, and shoulder girdle failed to show any evidence of tumors, aneurysms, fractures, cervical ribs, or other abnormalities. Recordings of the skin temperatures with a thermocouple, shown in Table 1, revealed that the affected extremity was warmer than the opposite one.

TABLE I.

	Right	*Left*
Hand (Dorsum)	89.3° F.	89.3° F.
Arm	89.8° F.	93.2° F.
Shoulder (Anteriorly)	91.9° F.	93.3° F.

Urine analysis and Wassermann tests were negative; the blood count was within normal limits.

Clinical Course: The patient was treated with rest and elevation of the affected arm and local infra-red exposures. The pain disappeared and the swelling gradually decreased. Three weeks after treatment was instituted, the patient absconded. He was seen again at his home five weeks later. He had been working regularly at his former job, but complained of some limitation of upward extension and tiredness of the left arm. At this time the extremity was still uniformly larger than the right. The superficial veins showed more dilatation, giving a distinct "marbling" appearance to the shoulder and anterior chest. The cephalic and basilic veins were also more prominent. The axillary vein was still palpable as a firm cord but no longer tender. The patient appeared in good health.

Fig. 2. Infra-red photograph of the same patient October, 1940, showing absence of the swelling but persistence of the dilated veins

The patient was next examined in April, 1940. He stated that since 1936 he had been well and had been continuously employed at hard manual labor. There was no impairment of strength nor limitation of motion of the left upper extremity. The swelling had disappeared entirely, and measurement at various levels showed no difference in the circumference of the right and left arms. No cord was palpable in the axilla. The dilated superficial veins had diminished in size, but were still easily discernible on the medial and anterior aspects of the left arm and in the left pectoral area. Comparison infra-red photographs were taken in October, 1940 (Fig. 2).

Discussion and Summary

As described in the literature, the patient with a primary thrombosis of the axillary vein is usually a healthy young male. The onset of the swelling is sudden and its progression rapid; it is accompanied by moderate pain. Constitutional symptoms are absent. A history of trauma is often elicited, but the vascular reaction may be out of all proportion to the degree of the trauma. In acute cases the thrombosed vein can be palpated in the axilla as a firm, tender cord. Later, the outstanding characteristic is the rapid development and persistence of a collateral venous circulation on the surface of the affected arm and the adjoining portion of the thoracic wall. These

dilated venous tributaries are excellently demonstrated with infra-red photography. The lesion is benign, for the thrombosed vein generally recanalizes. Treatment is simple and the end results are good.

The case here presented was observed for four years and conforms closely to the typical clinical picture. The exceptional features are the lack of any antecedent trauma or strain and the involvement of the left arm in a right handed individual.

References:

1. VON SCHROTTER: quoted by MATAS.[3]
2. PAGGI, B.: quoted by MATAS.[3]
3. MATAS, R.: *Am. J. Surg.*, 24, 642, 1934.
4. VEAL, J. R., and MCFETRIDGE, E. M.: *Arch. Surg.*, 31, 271, 1935.
5. KAPLAN, T.: *J. A. M. A.*, 110, 2059, 1938.

An Analysis of Toe Injuries

—In Relation to Accident Prevention—

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TOE injuries were found to be an important cause of production time loss at the Navy Yard, New York. One hundred and twelve cases of severe toe injury seen at the Yard Dispensary during one year were studied for this report. The findings are of interest because:

1. They demonstrate the financial and production time loss which could have been largely prevented by means of an available safeguard.
2. They indicate a marked difference in hazard among the various trades in the Navy Yard.
3. They serve as a basis of comparison for other Yards and for future periods of observation.

The cases are analyzed under the following headings:

(a) Frequency of fractured toes.
(b) Frequency of contused toe injuries causing lost-time.
(c) Time-loss from fractured toes.
(d) Distribution of cases by occupations.
(e) Comparative hazard of broken toes in various trades.
(f) Seasonal distribution of toe fractures.
(g) Site of fracture as determined by x-ray examination.
(h) Financial aspects of toe injuries.
(i) Prevention of toe injuries.
(j) Recommendations.
(k) Summary.

Frequency of Fractured Toes

NINETY-NINE proved cases of fractured toes were seen at the Dispensary in one year. Five men were not regular Navy Yard employees. Of these, four were W.P.A. workers and one was employed by a private contractor on a Yard project. Only the cases involving regular Yard employees were included in the analysis of lost-time. These men represent 0.83% of all the industrial workers during the period of this study. In other words, one out of every 115 workers in the New York Navy Yard broke a toe during the year.

Frequency of Contused Toes Causing Lost Time

NINETEEN cases of contusion of the toes were so severe as to require absence from work. These cases lost 95 working days during the year. When this group is added to those cited under the previous heading, we find that: One out of every 96 industrial workers suffered a lost-time toe injury during the year.

The monthly accident reports of the Yard show that there were 930 lost-time accidents from all causes during the year. The 93 toe injuries that required pass-outs accounted for exactly 10% of all the tabulatable accidents in the Yard.

Time-Loss From Fractured Toes

SEVENTY-FOUR of the men with fractured toes lost a total of 1056 working days. The average number of days lost per man was 14.3. The longest disability was 42 days. This occurred in two cases. Twenty men continued working despite their broken toes, most of them at light duties. No attempt has been made to assess the loss of efficiency in this group. The total time lost for the combined group of fractures and contusions was 1153 days.

Of the 32,125 working days lost because of industrial accidents at the Navy Yard during the 12 months covered in this report, 22,500 days were the statistical charges for three deaths and a traumatic amputation through the thigh. If these are deducted from the total, we find that 9,625 working days were lost because of common injuries. The 1153 day loss incident to toe injuries alone represents 12% of this entire amount.

Distribution of Fracture Cases by Occupations

TABLE 1.

Riggers	10	
Riggers Helper	4	
		14
Shipfitter	2	
Shipfitter Helper	7	
		9
Machinist	6	
Machinist Helper	3	
		9
Laborer		7
Driller		7
Shipwright		7
Sheet Metal Worker		6
Pipefitter	2	
Pipefitter Helper	3	
		5
Welder		4
Plumber	2	
Plumber Helper	1	
		3
Chipper and Caulker		3
Holder On		2
Joiner		2
General Helper		2
Boatbuilder		2
Blacksmith Helper		2
Boilermaker, Boilermaker Helper, Flange Turner, Brakeman, Painter, Millman, Packer, Coppersmith Helper, Electrician, Molder Helper, Firewatch: Each		1

No significant relation was found between the type of fracture and the duration of disability. Simple, compound, chip, fissure and comminuted fractures caused the same average time-loss. Fractures entering a joint did not increase the disability. In no case did complications prolong the disability. Bone necrosis, mentioned as a frequent complication in the literature, did not occur in any case in this series.

IT WILL be noted that 31 occupations were involved. The highest incidence was among riggers, i.e., 10.6%. No remarkable prevalence is found among the remaining occupations.

Comparative Hazard in Various Trades

TABLE 2.

Trade	Average Number Employed	Fractures	Incidence %
Shipfitters*	2502	9	.36
Machinists*	1934	9	.47
Welders	677	4	.69
Plumbers*	661	3	.45
Laborers	638	7	1.10
Sheet Metal Workers	551	6	1.88
Riggers*	457	14	3.06
Joiners	557	2	.36

*Includes Helpers.

MARKED variations in incidence are apparent from Table 2. More than 3% of the riggers employed in this Yard were disabled by fractured toes in one year. The shipfitters have only 1/10th as many broken toes as riggers. Other occupations fall between these extremes, and the figures of Table 2 may be compared with the average incidence of 0.83% for all the industrial Yard workers.

Seasonal Distribution of Toe Fractures

ANALYSIS of the injuries by months shows an increase in frequency of toe injuries during the summer. In the five months from April to August inclusive, there were 54 cases, but in the remaining seven months there were only 40 cases. Since these figures run counter to the curve of employment, they may be considered significant. One reason for this seasonal increase might be the tendency of workers to wear lighter footgear during the summer months.

Site of Fracture as Determined by X-Ray

COMPLETE x-ray studies were available in 91 cases. In several instances more than one bone was broken. When the fractures were classified according to anatomical distribution, the following bones were found involved:

TABLE 3.

	Distal Phalanx	Middle Phalanx	Proximal Phalanx
Great Toe	67		8
Second Toe	9	1	0
Third Toe	5	0	2
Fourth Toe	1	0	1
Fifth Toe	1	0	4

Of all the fractures seen, 73.6% involved the distal phalanx of the great toe. The two bones

Fig. 1. X-ray of workman's feet wearing one ordinary and one safety shoe. Note that area A, which includes one bone of the great toe and two bones of the second toe, is completely protected

of the great toe suffered 82% of the fractures of all 14 toe bones.

Financial Aspects of Toe Injuries

IN addition to the loss of productivity inherent in 1,153 sick days, the cash value of the lost time in one year was $7,300.49. This sum is calculated from the base per diem pay of each injured worker. The money loss for the 94 fractured toes was $6,683.15, and the loss from the 19 severely contused toes was $617.34. During the period of this study the average number of employees at the New York Navy Yard (excepting clerks and draftsmen) was 10,845. The wage loss from toe injuries per industrial employee was therefore 67.3 cents for the year.

The 437 riggers lost 140 days of working time, with a pay value of $783.74, or $1.79 per man; almost three times the Yard industrial average.

Prevention of Toe Injuries

THE foregoing figures would have no point if toe injuries were not readily preventable. Most of this loss of $7,300 in wages and 1,153 work-

Fig. 3. A safety shoe, showing the metal toe cap

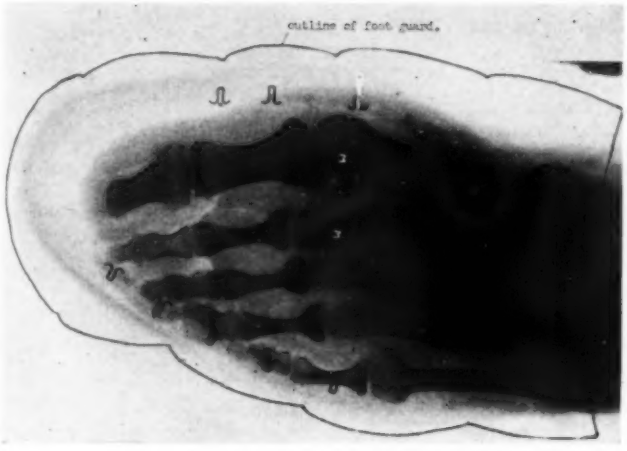

Fig. 2. Diagram showing the portion of the foot that is covered and protected by a foot guard. Note that in addition to all the toe bones, large parts of the metatarsals (3) are protected

ing days plus the expenditure of time and money for medical care is avoidable.

The most commonly used protective device is the Safety Shoe. The x-ray (Fig. 1) shows the feet of a workman wearing one ordinary and one safety shoe. The area marked "B" is the shadow of the metal toe cap in the safety shoe. Note that this completely covers and protects the distal phalanx (A) of the great toe, and the middle and distal phalanges of the second toe. Seventy-one of our cases, or 75.5%, representing a time loss of 810 working days and a wage loss of $5.162.66, had the injury fall entirely within this area.

There is abundant evidence that the metal tip of a safety shoe will protect the underlying toes against an impact of less than 300 foot pounds. Because the toe cap of the shoe rises higher than the vamp (Fig. 3), it tends also to break the force of blows that might fracture those portions of the toes not completely covered by the metal cap. After careful consideration of the nature of the accident, and the type and location of injury in each of our lost-time cases, it is considered unlikely that more than seven of the fractures would have occurred if safety shoes had been worn.

Fig. 4. A foot guard in use

Another commonly employed protective device is the "Foot Guard." This is entirely independent of the shoe, and is worn as an accessory. As can be seen from the x-ray (Fig. 2), this covers a much greater area than the safety shoe, and will therefore protect the metatarsals as well as the toes. This protective device has only slight applicability to Navy Yard employees because it makes climbing, stooping and kneeling practically impossible. This limitation does not apply to safety shoes.

It has been amply demonstrated in many industries that prevention of toe injuries by voluntary use of safety shoes is unsatisfactory. Personal observation has shown that practically none of the supervisors and leading men, and less than 5% of the industrial workers in the Navy Yard are wearing safety shoes at this time.

Case No. 3 of our series demonstrates how little may be accomplished by dependence on voluntary industrial safeguards. G. A., a rigger, lost four working days in January, 1931, because of a severe contusion of the toes of the left foot. In April, 1937, he broke the toes of the same foot, required hospitalization, and lost 28 working days. In January, 1940, still not wearing safety shoes, he again broke his left great toe.

The compulsory wearing of safety shoes by all industrial workers in the Navy Yard is the most practical single method of reducing the incidence of broken toes. Our figures indicate that this one measure promises to decrease the annual tabulatable accidents by approximately 10%.

A less efficient alternative is the requirement of safety shoes only for workers engaged in the more hazardous occupations, such as riggers. This alternative must not obscure the fact that the *only* way to eliminate the loss from broken toes is to make the wearing of safety shoes a requirement for all industrial workers, just as the use of welder's and chipper's goggles, leather protective clothing, ventilating blowers and other safety measures has become an integral part of the working equipment of a Navy Yard.

Summary

THERE were 94 cases of fractured toes, and 19 lost-time cases of contused toes among the 10,846 industrial workers at the New York Navy Yard in one year.

2. The incidence of fractures was 0.83%, or one out of every 115 industrial workers. Fractures and contusions combined affected 1.04%, or one out of every 96 men.

3. There were 93 pass-outs due to toe injuries. This is 10% of all the pass-outs for all causes for the year.

4. The time loss due to toe injuries was 1,153 days and the financial loss was $7,300.49. The average loss per man was 14.3 days. Toe injuries account for 12% of all time lost because of ordinary industrial accidents at this Yard.

5. No cases occurred among clerks, draftsmen or other office personnel.

6. A marked difference in hazard exists among the 31 occupations involved in the 94 cases of fracture. Riggers represented 10.6% of the cases. One out of every 30 rigers had a broken toe during the year.

7. There is x-ray evidence that 75.5% of the cases would have been prevented by safety shoes. An additional 17% of the cases would probably have been averted with this protection.

Conclusion

THE wearing of safety shoes should be compulsory for all Navy Yard employees, with the exception of draftsmen, and clerical and supervisory personnel.

(b) In the event that this measure is impracticable for all workers, the wearing of safety shoes should be required for riggers, sheet metal workers, and laborers.

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Electrolytic Sodium Hypochlorite

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THE use of sodium hypochlorite irrigation in the treatment of infected wounds has been complicated by the difficulty of preparing Dakin's solution and maintaining an optimum chlorine concentration. At the Methodist Hospital in Brooklyn these difficulties have been successfully overcome by using an inexpensive stable commercial electrolytic sodium hypochlorite solution in the Carrel-Dakin technique.

The commercial sodium hypochlorite resembles Dakin's solution as shown in the following table:

	Dakin's solution	Commercial Sodium Hypochlorite solution	
		Undiluted	Diluted 1:4
1. Sodium hypochlorite	0.45-0.5%	1%	.2%
2. Sodium chloride	1%	10%	2.%
3. Sodium hydroxide	None	0.025%	.005
4. Sodium carbonate	None	0.1%	.02
5. Sodium borate	0-0.5%	None	None
6. Total solids	2%	11%	2.2
7. pH	9.	11.	10.5

The greater stability of the electrolytically prepared sodium hypochlorite enhances its clinical value. The nursing staff prepare the solution on the wards; one part of concentrated stock solution of electrolytic sodium hypochlorite with one part of water is equivalent in chlorine concentration to Dakin's solution.

It has been cheaper and more convenient to prepare the commercial electrolytic sodium hypochlorite than to replace Dakin's solution of an equivalent chlorine concentration.

Comparative laboratory tests were made, using three modifications of sodium hypochlorite solutions of Dakin's strength, to determine the relative stability, germicidal activity and tissue toxicity. Two of these were prepared from calcium hypochlorite[b] according to the methods described by Dakin and Dunham, and neutralized to phenolphthalein with boric acid and sodium bicarbonate respectively. The third solution was prepared by diluting the electrolytic sodium hypochlorite solution to the desired chlorine concentration with distilled water.

STABILITY: The chlorine concentration of the three sodium hypochlorite solutions was measured before and after six month's storage in closed bottles at room temperature. A 1:4 dilution of the electrolytic sodium hypochlorite solution was included in the series because it was the concentration commonly used at the Methodist Hospital. The available chlorine was determined on each sample by the usual method of titration with

b. Acme Chlorinated Lime (Av. Cl_2 24%) B. T. Babbit, Inc., New York.

TABLE II.
GERMICIDAL ACTIVITY OF VARIOUS SODIUM HYPOCHLORITE SOLUTIONS OF DAKIN'S STRENGTH

Dakin's Solution	Available Cl_2 (%)	No Organic Matter				10% Horse Serum			
		Dilution	5	10	15	Dilution	5	10	15
Neutralized with H_3BO_3	0.49	1-40	0	0	0	1-10	0	0	0
		1-45	†	0	0	1-15	†	0	0
		1-50	†	†	0	1-20	†	†	†
		1-55	†	†	†				
Neutralized with $NaHCO_3$	0.49	1-40	†	0	0	1-10	0	0	0
		1-45	†	0	0	1-15	0	0	0
		1-50	†	†	0	1-20	†	†	†
Prepared from Electrolytic NaOCl Solution	0.52	1-45	0	0	0	1-15	0	0	0
		1-50	†	0	0	1-20	†	†	†
		1-55	†	†	0				

0 indicates no growth.
† indicates growth.

sodium thiosulphate in the presence of potassium iodide. The data are presented in Table I.

TABLE I
STABILITY OF SODIUM HYPOCHLORITE SOLUTIONS

	Dakin's Solutions		Commercial NaOCl Solution		
Time of Storage	#1* % Cl_2	#2** % Cl_2	Undiluted % Cl_2	1:1 % Cl_2	1:4 % Cl_2
Fresh	0.52	0.50	1.08	0.52	0.22
6 Months	0.16	0.20	1.06	0.50	0.21
Loss	0.36	0.30	0.02	0.02	0.01
% Loss	69	60	1.9	3.8	4.5

*Solution neutralized to phenolphthalein with boric acid.
**Solution neutralized to phenolphthalein with sodium bicarbonate.

The two hypochlorite solutions prepared from calcium hypochlorite showed a marked loss in available chlorine content following six months storage. The loss in available chlorine in the electrolytic sodium hypochlorite solution was much less.

GERMICIDAL TESTS: The germicidal efficacy of the various Dakin's solutions was compared using the F.D.A. Phenol Coefficient Method of Testing. An 18 and 24 hour broth culture of Staphylococcus aureus of the proper phenol resistance was used as the test organism. One series of tests was conducted with no organic matter present, while the other was conducted in the presence of 10% normal horse serum. The 10% horse serum was added to the culture before exposure of the latter to the sodium hypochlorite. All tests were conducted at 37° C. The results obtained are presented in Table II.

No appreciable differences in germicidal action were found for the three hypochorite solutions of equivalent chlorine concentration.

TISSUE TOXICITY TESTS: Of the methods available for determining tissue toxicity of germicides, that presented by Salle *et al.* is, for purposes of comparison, most practical and informative.

In our investigation, tests were conducted to determine the toxicity indices of the three sodium hypochlorite solutions of Dakin's strength using Salle's method. These solutions exerted such low toxicity toward embryonic tissue that their indices could not be calculated. Fibroblastic proliferation was observed in all instances following exposure to the lowest dilution possible by this method.

In order to compare the toxicity indices of the three hypochlorite solutions, it was necessary to double the original chlorine concentration. The indices obtained showed that the three modifications of hypochlorite solutions were about equally toxic for embryonic tissue. These indices are presented in Table III. For the sake of comparison, we also give toxicity indices for Lugol's solution, azochloramid and phenol.

The toxicity index of sodium hypochlorite is lower than any toxicity index thus far reported.

One part of electrolytic hypochlorite with one part of water corresponds to Dakin's solution. Dilutions up to 1:5 are useful clinically, the strength varying with the type of case under treatment. A dilution of one part of sodium hypochlorite in four parts of water has proved satisfactory and can be used not only in treatment of infection but also in its prevention.

TABLE III.
TOXICITY INDICES OF SODIUM HYPOCHLORITE AND OTHER GERMICIDES

		Average Killing Dilution		Average Toxicity Index	
Solution Tested	Tissue	Staph. aureus	E. typhosa	Staph. aureus	E. typhosa
NaOCl—Neutralized with H_3BO_3	1:2.5	1:15	1:47	0.17	0.05
NaOCl—Neutralized with $NzHCO_3$	1:2.5	1:17	1:38	0.15	0.07
Stabilized Electrolytic NaOCl....	1:2.5	1:16	1:50	0.16	0.05
Lugol's Iodine Solution.....	1:425	1:2375	1:3550	0.18	0.12
Azochloramid.....	1:5600	1:11, 160	1:10, 500	0.48	0.53
Phenol U.S.P.....	1:244	1:85	1:158	2.9	1.5

Commercial sodium hypochlorite has been used in the accident wards of the Methodist Hospital to prevent infections of recently sustained wounds. In hospitals having large accident wards and ambulance services, there may be unavoidable delay before adequate treatment can be given. The wound may be trivial and require only a simple suturing in the emergency room or it may be an extensive injury requiring the use of the operating theatre. For at least six years it has been the custom at the Methodist Hospital to require the nurses in charge of the accident ward to soak all wounds immediately in a one to four dilution of sodium hypochlorite. Whenever possible the wound is immersed directly in the solution; otherwise, wet gauze dressings saturated with sodium hypochlorite are placed over the area. This soaking is carried out for at least 20 minutes. At the time of treatment the usual preparations to insure asepsis are carried out.

TABLE IV.
TRAUMATIC SURGERY
Minor Cases

	Number of		
Type	Cases Treated	Cases Followed up	Infections
Lacerations of:			
Wrist, hand, fingers...	183	93	3
arm and forearm.....	20	10	0
ankle, foot, toes.....	11	7	1
thigh and leg.....	29	15	3
face.....	124	63	2
scalp.....	68	40	1
ears.....	3	3	0
Contusions and Abrasions	5	3	0
Crushing Injuries.....	8	5	2
Puncture Wounds.....	5	4	0
Old Lacerations.....	3	3	0

Because of the good results obtained, a detailed study was conducted from April, 1938, to April,

1939. Four hundred and fifty-nine minor traumatic injuries were treated for the prevention of infection by this method during this time. The statistical results are presented in Table IV.

During the same period 47 major traumatic injuries were treated. Table V presents the data in these cases.

TABLE V.
TRAUMATIC SURGERY
Major Cases

Type	Number of Cases Treated	Average Hospital days	Remarks
Lacerated Tendons.....	22	12	3 mild and 1 severe infection.
Compound Fractures...	18	28	2 severe and 2 mild infections. 1 case died of subdural hematoma after 20 days.
Traumatic Amputations	7	10	No infection. No mortality.

Sodium hypochlorite is useful in the treatment of suppuration. The tenets laid down by Carrel and Dehelley were closely followed. All debris on the skin surface around the wound must be scrupulously cleaned away daily with green soap and water, all hair removed with a sharp razor.

During the one year period of study the following types of suppuration were treated.

1. Empyema.
2. Acute hematogenous osteomyelitis.
3. Deep abscesses.
4. Infected burns.
5. Chronically infected ulcers.
6. Preparation of granulating areas for skin grafting.

Concentrations of sodium hypochlorite up to 1:5 were used both prophylactically and therapeutically in the treatment of open wounds. The 1:4 dilution exhibited the same germicidal and tissue cleansing power clinically as the 1:1 dilution.

No general toxic effects of sodium hypochlorite were observed. Locally it may cause an erythema with bleb formation about the wound edges. This can be prevented by the use of vaseline gauze or by repeatedly washing the skin with normal saline. After normal granulations have appeared, further irrigations or wet dressings of sodium hypochlorite, like Dakin's solution, may retard the granulation and epithelization of wounds if used too long.

Electrolytic sodium hypochlorite is a deodorant. Those wounds which have a foul discharge are less offensive when this solution is used.

Summary

COMMERCIAL electrolytically prepared sodium hypochlorite is stable in comparison with Dakin's solution and economical to use.

2. Electrolytic sodium hypochlorite compares favorably with Dakin's solution in germicidal activity and clinical efficiency.

3. Its prophylactic uses in potentially infected wounds are given.

4. Its therapeutic use in suppurative conditions is described.

A Physical Fitness Service

—*Results Obtained with 350 Policyholders*—

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and
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A PHYSICAL FITNESS SERVICE for the executives and employees was inaugurated at the home office of the Aetna Life Insurance Company in May, 1932. Because of the favorable results obtained,[1] this service has been offered 1970 policyholders insured from the office of the general agent at Hartford. These policyholders, with few exceptions, resided in the State of Connecticut.

From January, 1935, to July, 1940, 350, or 17.8%, have applied for the service.

Our physical fitness service consists of a uniform physical examination, a check up of faulty health habits and daily programs of activities and the opportunity for return visits.

We have divided our group of 350 into two groups; optimum weight and overweight. Those who are not overweight are considered optimum. Underweight, unless extreme, is not an unfavorable factor in adults. Those are considered overweight who are in the high mortality zone of overweight as indicated by the actuarial tables of weight and height.

Our physical and health examination findings were as follows:

RANGE IN AGE: 18-79 years. (Ave. 45 years.)	No.	Percent
12 - 18	2	1
20 - 29	26	7
30 - 39	92	26
40 - 49	119	34
50 - 59	79	23
60 - 69	27	8
70 - 79	5	1
	350	100

WEIGHT ZONES	No.	Percent
Overweight	189	54
Optimum weight	161	46
	350	100

PHYSICAL DEFECTS	No.	Percent
Overweight	189	54
Hypertension	42	12
Malocclusion	47	15
Deviated septum	44	13
Dead teeth	27	8
Flat feet	20	6
Hernia	15	4
Eczema and other skin defects	8	2
Varicocele	4	1
Nasopharyngeal obstruction	3	1
Hemorrhoids	3	1
Varicose veins	2	1

1. "Health Diagnosis in Adults," *Industrial Medicine*, Jan. 1935, Vol. IV, No. I, pp. 1-4; EMERSON and CRAGIN.
"Hypertension and Health Diagnosis," *J.A.M.A.*, Sept. 24, 1938, Vol. III, pp. 1174-1178; EMERSON and IRVING.

PHYSICAL DEFECTS	No.	Percent
Pyorrhea	1	.3
Deafness	1	.3
Facial paralysis	1	.3
Bronchitis	1	.3
Mitral regurgitation	1	.3
Pylorospasm	1	.3
Diabetes	1	.3
Albumen-casts	1	.3
Prostatitis	1	.3
Total number physical defects	413	
Average	1.2	
Referred to family physician	71	(20%)
Referred to dentist	93	(27%)

FAULTY HEALTH HABITS	No.	Percent
No regular rest periods	309	88
Fast eating or washing food down	159	45
Insufficient exercise or outdoor sunlight	142	41
Habitual overeating or undereating	96	27
Eating when overtired	52	15
Overdoing at work or play	47	13
Excessive tea, coffee, alcohol or tobacco	33	9
Inadequate vacations or weekly rest	30	9
Irregular mealtimes	30	9
Habits injurious to health	26	7
Worry and fretfulness	26	7
Irregular bedtime	26	7
Removable physical defects uncorrected	18	5
Candy or sweets between meals	16	5
Finicky about food	14	4
Working in poor air above 68°	13	4
Irregular time of bowel movement	11	3
Irregular habits of living	9	3
Sleeping with windows closed	7	2
Uncontrolled likes and dislikes	4	1
Total number faulty health habits	1068	
Average	3.1	

The average for overweight group was 3.3; that for the optimum 2.7.

Visits

FOLLOWING their check up for physical defects and faulty health habits, the 350 policyholders have made 1431 visits to our department while working for better health. An average of four visits.

The overweight and hypertension cases were especially interested to improve their condition. The results with these two groups were as follows:

Overweight

THERE were 189 cases, or 54%, in the high mortality zone of overweight.[2] Of this number, 83 made an average of 9.4 visits and reduced their weight 597 pounds, an average reduction of 7.2 pounds. This reduction was found after periods ranging from a few weeks to five and a half years following their first visit.

Hypertension

THERE were 42 cases of hypertension. Their systolic blood pressure readings ranged from 144 to 250 mm. Of these cases, 38, or 90%, were overweight from four to 70 pounds, an average of seven pounds.

Among 26 cases, there was a reduction in weight an average of seven pounds and a reduction in blood pressure an average of 22 mm. The blood pressure readings were taken an average of 19 months after their first visits. One additional case, overweight, did not follow directions. He returned three years and three months after his first visit having gained in weight. His blood pressure had increased from 164/98 to 198/114.

Of the remaining 15 cases, who did not return for follow-up, three, 20%, have died of cardiovascular disease. Of the 27 cases who did return, one, 3.7%, has died of the same affection.

Mortality Rate

THE number of deaths that have occurred among the 350 policyholders examined in our department, excluding one death by accident, was seven, or 2%. The causes of their deaths, in order of frequency, were as follows:

	No.	Percent
Cardiovascular	4	57
Cancer	2	29
Cirrhosis of liver	1	14
	7	100

The number of deaths that have occurred among the 1620 cases who did not apply for our service, excluding one death by accident, was 59, or 3.6%. The causes of their deaths, in order of frequency, were as follows:

	No.	Percent
Cardiovascular	31	53
Cancer	6	10
Suicide	5	8
Pneumonia	3	5
Cirrhosis of liver	2	3
Appendicitis	2	3
Tuberculosis	2	3
Diabetes	2	3
Influenza	1	2
Meningitis	1	2
Gastric ulcer	1	2
Bulbar palsy	1	2
Strep. septicemia	1	2
Gangrene	1	2
	59	100

For the purpose of obtaining further data on mortality, we have compared the number of deaths among 238 male policyholders who reported to our department with a control group of 238 male policyholders who have not reported to us. For each one of our number, we have taken one of the same year of birth who took out insurance on the nearest date of the same year.

The deaths that occurred among the 238 who came in was 1.3%, while that among the 238 not coming in was 2.1%.

It is thus seen that the death rate of the whole group of 350 who took our service was 44% less than that of the 1620 who did not come in; while the death rate of the controlled group of 238 who came in was 40% less than that of the 238 who did not come in.

Changes in Sub-Standard Ratings

A METHOD of evaluating the physical condition of insurance risks in terms of life expectancy is by means of changes in sub-standard ratings.

According to current underwriting practices of the Aetna Company, impaired risks are classified

2. Medico-Actuarial Investigation of 1912.

in four sub-standard groups in which the increased mortality is 133, 166, 200 and 260% of the standard expectation. A reduction in life expectancy of five to 18 years.

Of 176 of our overweight cases, 40 were either sub-standard or uninsurable at the time of their first visit. Of these 40, the last visits showed three were uninsurable; one had become insurable, two were still uninsurable for reasons other than overweight. There were 16 who improved their condition markedly, 13 of whom became eligible for standard risk class.

Of our 42 hypertension cases, 19 were uninsurable at the time of their first visit to our department. The condition of 10 of these was so improved that they were eligible for sub-standard insurance and three for standard. Among 17 cases showing hypertension at their first visit nine had become standard risks, two had improved their rating class, and six remained unimproved or did not return.

Comments

IN offering our physical fitness service to the policyholders, three questions arose; first, how many would apply for the service? Thus far, 350, or 17.8% of the 1970 to whom notices were sent have responded.

Second, how many would be interested enough to make the follow-up visits necessary to effect correction of physical defects and faulty health habits? The 350 policyholders have made 1431 visits to our department, an average of four visits. Also, 94 policyholders outside Hartford have travelled 14,316 miles from 45 towns throughout the state, making an average of 3.5 visits to our department. Favorable reaction to the service is further shown by replies to a questionnaire asking that the policyholder state his opinion freely as to its value. Of 87 who evaluated the service by letter, 99% were favorable, as follows:

Evaluation of Service	Number	Percent
(a) of great value	39	45
(b) of much value	31	36
(c) worth time spent	16	18
(d) waste of time	1	1
	87	100

Third, what results could be obtained by those taking the service? Improvement in general health, resistance in efficiency cannot be measured accurately but the results obtained in reduction of overweight, of hypertension and mortality rate can be given in percentages. This statistical evidence is not conclusive because the number of cases is too small and the time covered too short; but it is of value in support of clinical evidence and its significance is further increased by the fact that many of the group checking up with us came in because of definite impairments such as overweight, high blood pressure or failing efficiency, thus making our group an unfavorable one for comparison with the group whose health was such that they saw no need for checking up with us.

The chief object of our health service is the prolongation of the lives of our policyholders. Any actual prolongation of life is not capable of definite proof. We can only say that the probable duration of life, or life expectancy, has or has not increased. For example: the death of an employee was reported to our department. On looking up his record, it was found he had never applied for our service nor had he reported repeated attacks of indigestion to any physician until his appendix had ruptured. He died at the age of 36 of general peritonitis. Had he reported, it may properly be said that a successful operation might have enabled him to live to the average age of 60 years, that is, he might have increased his life expectancy about 24 years.

Similarly, according to the two measurable factors of overweight and hypertension which have fairly definite mortality rates, our results show that life expectancy in a number of cases has been increased five to 18 years.

We believe that the most reliable evidence however of a general increase in life expectancy, is the clinical improvement in health among the policyholders who have followed our program by reporting to their own physicians for correction of physical defects found and by checking up regularly with us for the correction of faulty food and health habits.

The fact that every policyholder had from two to five serious faulty health habits such as habitually overeating, lack of regular exercise, and indoor living, explains the improvement in health which followed their correction.

The physical fitness service supplies a need of the policyholder that does not interfere unfavorably with his relation to his own physician because we refer all who need medical or surgical care to their own doctors, thus helping correct the unfortunate situation that patients see their physicians often too late to be helped.

On the other hand, the policyholder rarely will go to any physician regularly for checking up his weight, diet and health habits and this regular check-up, over a considerable period of time, is necessary for his re-education in food and health habits that make results permanent.

At the first examination of each policyholder, after referring him to his physician or dentist for the correction of any defects, we remark: "You need also to correct errors in your daily program of living and thus attain greater efficiency. We believe by so doing you can prolong your life from three to 10 years and, what is more, the period of your working efficiency. We want you to live longer. We want your premiums. Are you interested?"

The usual reply is that his interest in his own life is greater than in that of premiums and he agrees to report each week until his condition is satisfactory.

Mortality experience in the United States shows that life after the age of 40 has not been extended appreciably in the past 50 years[3] and that after

3. "The Search for Longevity," RAYMOND PEARL, *The Scientific Monthly*, May, 1939, Vol. XLVI, page 466.

the age of 70 it is even shorter. The reason for this is the increase in degenerative diseases, chiefly cardiovascular, caused by faulty health habits that have offset the gains made by medical science in its conquest of most of the fatal diseases.

The average duration of life however has been increased by some 10-12 years. This has been brought about chiefly by a study of the essentials of health of the infant. Similar study of the essentials of health in the daily program of adults, as here presented, has led to the correction of the faulty health habits of the policyholders and therefore should prolong their lives possibly to a like extent.

Early death can be prevented in many instances by almost any form of health or medical work, even by the common sense of the individual himself; but the method here described is, we believe, capable of increasing life expectancy to at least some degree in practically all cases.

By our physical fitness service the policyholder attains a higher standard of health, a vital matter to him, while any increase in life expectancy is an important matter in insurance practice as the possible savings in interest and premiums run into large figures.

Summary

A PHYSICAL FITNESS SERVICE was offered 1970 policyholders of the Aetna Life Insurance Company. From January, 1935, to July, 1940, 350 (17.8%) applied for the service.

The 350 cases had an average of 1.2 physical defects and 3.1 faulty health habits.

There were 189 cases of overweight and 42 cases of hypertension.

The entire group made 1431 visits, an average of four visits.

Eighty-three policyholders reduced their weight an average of 7.2 pounds.

Twenty-six hypertension cases reduced their blood pressures an average of 22 mm. Weight and blood pressure readings were taken an average of 19 months after first visits.

Among the 26 hypertension cases who followed our program there was one death. Among the 15 cases who did not return there were three deaths.

The mortality rate of the 1620 who did not apply for the service was 3.6%. That of the 350 who were examined was 2%.

The mortality of a control group of 238 men of the same age and who had taken out their insurance the same year as 238 men who reported, was 2.1%. That of the 238 reporting was 1.3%.

Of 36 uninsurable and sub-standard risk cases, 24 improved markedly, 12 of them to a standard risk class.

The improvement in sub-standard ratings and the lower rates in mortality, 44% in the larger group and 40% in the controlled group, are explained chiefly by the correction of the two measurable factors that affect mortality, namely, overweight and hypertension.

The prevention of untimely deaths, even of a comparatively few of the larger policyholders of an insurance company, effects a financial saving that runs into large figures. We believe that the physical fitness service here described is capable of increasing life expectancy to some extent in practically all cases.

Evidence that life expectancy has been increased is as follows:

(a) A lower death rate.

(b) An increase in some cases of 5-18 years in life expectancy, according to changes in sub-standard cases to better ratings.

(c) A maintained reduction in overweight cases.

(d) A maintained reduction in hypertension cases.

(e) Clinical evidence of improved health.

Industrial Medicine and Surgery

—Proceedings of the Twenty-Second Annual Meeting of the Central States Society of Industrial Medicine and Surgery, held in Joint Session with the Annual Meeting of the Iowa State Medical Society, Davenport, Iowa, May 13, 1941—

Reported by
C. O. SAPPINGTON, M.D., DR. P.H.

A SYMPOSIUM on Trauma formed the basis for the Twenty-Second Annual Meeting of the CENTRAL STATES SOCIETY OF INDUSTRIAL MEDICINE AND SURGERY (a Component Society of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS) held in conjunction with the Annual Meeting of the Iowa State Medical Society, at Davenport, Iowa, May 13, 1941.

President JAMES A. VALENTINE of the Central States Society presided at the sessions, and the program was in charge of DR. ROLAND A. JACOBSON, Chicago, and DR. DONALD C. CONZETT, Dubuque, Iowa. The Committee on Local Arrangements was composed of DR. WILLIAM C. GOENNE and DR. WILLIAM G. BESSMER, both of Davenport, Iowa. The program follows:

"Primary Care of Traumatic Wounds"—LEWIS M. OVERTON, M.D., Des Moines, Iowa.

Discussion—EMERY B. NEFF, M.D., Moline, Illinois.

"Traumatic Injuries of the Chest"—WILLARD VAN HAZEL, M.D., Chicago, Associate Prof. of Surgery, U. of I.

Discussion—JOHN B. MOORE, M.D., Benton, Illinois.

"Peripheral Neuritis Following the use of Serum"—JOHN L. GARVEY, M.D., Milwaukee, Wisconsin, Clinical Prof. of Neurology, Marquette University.

Discussion—ROLAND A. JACOBSON, M.D., Chicago.

"Fractures of the Patella Based on a Study of 554 Cases"—J. E. M. THOMSON, M.D., Lincoln, Nebraska.

Discussion—DOUGLAS N. GIBSON, M.D., Des Moines, Iowa.

"Compensation Evaluation"—OLIVER J. FAY, M.D., Des Moines, Iowa.

Discussion—FREDERICK W. SLOBE, M.D., Chicago.

"Early Management of Fractures of Long Bones"—WILLIAM R. CUBBINS, M.D., Chicago, Clinical Prof. of Bone and Joint Surgery, Loyola University School of Medicine.

Discussion—JAMES A. JACKSON, M.D., Madison, Wisconsin.

EVENING SESSION—Dinner in honor of guest speaker.

"The Relationship of the New Antiseptics to the Treatment of Infected Wounds and Septicemia"—H. WINNETT ORR, M.D., Lincoln, Nebraska. General Discussion.

DR. LEWIS M. OVERTON, of Des Moines, Iowa, presenting the subject "Primary Care of Traumatic Wounds, stated that there was really nothing new in his presentation, but that there was extensive literature. Bad results usually occur because of not recognizing the importance of early treatment. This report contains material on cases treated in the first six hours.

During the first day, one should give attention to the control of bleeding, proper dressing, and the treatment of shock. The skin around the wound is washed carefully with soap and water and then the wound itself is irrigated with warm sterile salt solution. Gloves and gown are then changed and a careful debridement is done, removing all nonviable tissue. Irrigation is again done with sterile salt solution. Meanwhile, a tourniquet having been applied, it is then removed and the bleeding points are fixed. The wound is dressed and splinted and left alone for a week.

Of the 247 cases reported in this series, the average loss from work was 2.69 days, this including 25 compound fractures.

Statistics were presented on incised and punctured wounds, compound fractures, and nerve and tendon sutures. Of the 183 incised wounds, 166 received no medication and 17 received treatment with sulfathiazole; of the 33 punctured wounds, 22 received no medication and 11 were treated with neoprontosil; of the 25 compound fractures, 23 received no medication and two were treated with sulfathiazole; of the six cases requiring special nerve and tendon treatment, four received no medication and two were treated with sulfathiazole. (Where the word "medication" is used, this denotes the type of medication applied directly to the wound.)

In summary, the value of early care has been stressed. The results justify very meticulous treatment. Infection occurred in 0.84% of cases. Only a small number of cases were treated with sulfa compounds and the series is too small on which to base any conclusion.

DR. EMERY B. NEFF, of Moline, Illinois, discussed Dr. Overton's presentation. His discussion stressed the necessity of very early consideration of infection and preventive methods for this purpose. There is a difference of opinion in different groups with respect to irrigation and what one should use for irrigation, if it is considered necessary to do it.

DR. WILLARD VAN HAZEL, of Chicago, discussed the subject "Traumatic Injuries of the Chest," using lantern slides to illustrate various points.

It is very difficult to be specific when speaking on this subject, because one must evaluate each case; in addition to an injury to the chest, there may also be an injury to the skull or to the long bones; there may also be shock, hemorrhage or pneumothorax associated.

An important first consideration is the condition of the heart and lungs and their functional capacity, because there may be an alteration of the cardio-respiratory mechanism caused by the nature of the chest injuries sustained. It is important to remember that Hedblom very early advocated multiple stage operations.

Chest injuries may be productive of the following: (1) hemorrhage, which may be pulmonary, a hemothorax, or affect the heart and great vessels; (2) pneumothorax, which may be spontaneous, tension, or in the form of a sucking wound; (3) emphysema; (4) infection, which may be in the chest wall, in the form of a pneumonia, an empyema, or a lung abscess.

The treatment of hemoptysis may be accomplished by morphine, by the induction of a pneumothorax, or by phrenicexeresis.

The treatment of hemothorax may be variable; (1) in the small stationary type, the treatment should be expectant; (2) in the large type, aspiration and pneumothorax; and (3) in the rapidly increasing type with symptoms of hemorrhage, transfusion and thoracotomy should be done.

X-ray films of various cases were presented, including one of an ice pick imbedded in the side; fracture of the clavicle; and multiple fractures of the ribs with hemothorax; cases were also shown with reference to the aspiration of blood after hemothorax, one with a spontaneous pneumothorax, and another with empyema, fistula and hemoptysis—in which iodized oil was used for visualization; finally, a case of Vincent's infection was shown, in which arsenic therapy was the solution of the problem.

The most common symptoms in traumatic injuries of the chest are pain, dyspnea and constriction of the chest.

In summary, we must always think of hemorrhage, pneumothorax, emphysema, and infection in these cases.

DR. JOHN B. MOORE, of Benton, Illinois, discussed Dr. Van Hazel's presentation.

In chest injuries, we should always have x-ray films made of the chest and should compare the original films with films taken subsequently.

A case demonstration was given of an injury to the right chest in which the scapula, clavicle and the 1st to the 9th ribs were fractured, the latter near the vertebrae and also in the axillary line. There was considerable emphysema of the chest wall and there was a large amount of internal hemorrhage as shown on the x-ray film. A subsequent film in four days after the first one showed the emphysema subsiding and the blood limited to the lower portion of the chest. The treatment was expectant, morphine being administered and as it happened, no pressure symptoms developed. Finally, one must always think of other organs when chest injuries occur, such as the liver, kidney and diaphragm, as these may be injured as well.

DR. JOHN L. GARVEY, of Milwaukee, Wisconsin, discussed "Peripheral Neuritis Following the Use of Serum."

There have been a number of papers on this subject. In 1939 Bennett made an excellent review of the literature showing that there had been 115 cases in the literature, mostly in the 10 years next preceding his review.

Subjective sensory disturbances are common, but not marked. In a negligible number of cases, complications come on at the height of disability. Pain is the most frequent symptom and may be controlled by morphine. The most common site of difficulty is the bracheal plexus, which is associated with an upper arm palsy. The cranial nerves are seldom involved. The pathology is not known, but it is thought to be a perineural urticaria. Little is known of prophylaxis.

In general, treatment consists of immobilization of parts, the proper use of heat, and the avoidance of manipulation. Protracted paralyses necessitate properly selected physical therapy and the administration of vitamins.

The prognosis is usually good, but there may be a high degree of permanent impairment.

In a 10-year period the author had seen six cases, of which three involved the shoulder group and in which two others had extensive multiple neuritis, and one in which the cranial nerves were affected.

Case histories on the six cases were presented, showing the details, which can be better appreciated by reading the text of the full paper, which will be published in a later issue of INDUSTRIAL MEDICINE.

DR. ROLAND A. JACOBSON discussed Dr. Garvey's paper.

The discussant had seen none of this type of case, but had had experience in 18 years' extensive use of serums and their administration. Joint pains usually occur subsequent to the administration of such serums, but this disturbance is only temporary. The discussant had seen no neuritis in his experience.

There had been one case observed, however, in 10 years on a hospital service in connection with the work of the discussant.

In 16,000 cases of scarlet fever patients, of which 60% had had serum, there had been no difficulty; probably that is due to the fact that there is a better serum at the present time. Similarly, in 5,000 cases of diphtheria, some paralyses had been seen, but they were thought to be due to the disease and not to the serum. In 500 cases of meningitis, all of which had serum, there were no instances of neuritis.

DR. J. E. M. THOMSON, of Lincoln, Nebraska, discussed "Fractures of the Patella Based on a Study of 554 Cases."

This is not a new subject, but is often associated with complicating factors. The simple fracture, which constitutes about 3% of all fractures, is not ordinarily disabling.

There are three schools of treatment: (1) the conservative school which advocates the reassembling of the fragments, holding them together by some type of method, and giving the patient a chance for the proper healing of his fracture; (2) complete excision of the patella; and (3) plastic repair of the tendon and the removal of loose fragments. It was believed by the essayist that the latter method of treatment is the best.

X-ray films on lantern slides were used to show the results of the different types of treatment.

In reporting on this series of cases, there were 118 cases of simple fractures, 274 simple comminuted, 56 compound, and 31 of unknown type. In 424 cases there was early repair, in 55 cases there was late repair, and in 75, the repair was incomplete.

The average age in these patients was 40 years; 29% were operated in the first 24 hours, 55% in three days, and 80% in seven days. The average period of immobilization was 4.17 weeks. The average working loss was 9.9 weeks. Three hundred and fifty of the 433 cases had no disability, whereas 83 had disability.

In concluding, the essayist emphasized the important points in making plastic repair in these cases.

DR. DOUGLAS N. GIBSON, of Des Moines, Iowa, in giving a very short discussion of Dr. Thomson's paper, stated that at first operation was not received with any enthusiasm, but now is very popular in fractures of the patella.

DR. OLIVER J. FAY, of Des Moines, Iowa, presented the subject "Compensation Evaluation."

This discussion was limited to general basis for compensation and the application of general principles. The laws and the administration of them differ very widely in different states.

Temporary disability presents the possibility of prolongation of convalescence, the weakening of morale, and the encouragement of malingering. It is believed that the average workman cannot deceive a careful practitioner, except in some instances of inguinal hernia. Explanation should be made to the workman with respect to various difficulties and if the workman remains obdurate, compensation should be discontinued.

Postoperative or post-inujry neuroses are relatively common. In many instances, a case is better handled by a lump-sum settlement.

It must be admitted in many instances in different states, the basis for award has been entirely arbitrary. It should also be remembered that an anatomical award is a functional one.

In summary, it should be stated that the attitude of the physician and surgeon should be one in the best interests of recovery, the prevention of permanent disability, and the restitution of the man to his former position. It should be emphasized that the surgeon represents only the medical profession, not the employee nor the employer.

DR. FREDERICK W. SLOBE, who was appointed to discuss the presentation of Dr. Fay, on account of the lateness of the hour, stated that he would release his time to Dr. Cubbins who was next on the program.

DR. WILLIAM R. CUBBINS, of Chicago, presented the subject "The Early Management of Fractures of Long Bones," using a series of x-ray slides to present various cases.

In a rather brief presentation, Dr. Cubbins discussed cases of displacement of the head of the femur, fracture of the rim of the acetabulum, fracture of the neck of the femur.

Especial emphasis was placed on the necessity of knowing where the anatomic points are, regardless of the appearance in the x-ray film. In a number of instances, as the essayist pointed out, beautiful pictures can be obtained without good results, and an illustration was given where 25 films were taken and still no decision was reached as to whether the head of the femur was displaced, whereas in the clinical examination it had been definitely decided that there was displacement.

DR. JAMES A. JACKSON, in discussing the presentation of Dr. Cubbins, stated that there were two schools with reference to the use of traction: (1) the use of primary operation and internal fixation; and (2) the school which does not believe in these procedures at all.

Dr. Jackson believed that it was necessary to take time to explain methods of techniques to assistants and to teach them properly, and that if enough time and effort and patience were spent on these principles, good results would be obtained in the surgical treatment of fractures. Quotations were given from Dr. Clay Ray Murray's writings, relative to the surgical principles in the treatment of fractures. Mention was made of the difference in the use of metals and especially, with reference to the good results obtained in the early days before modification of the metals which are used today. In concluding, the discussant emphasized the importance of proper and tried methods of surgical technique.

Dinner Session

AFTER the dinner in honor of the guest speaker, Dr. DONALD C. CONZETT, of Dubuque, Iowa, introduced the speaker of the evening, DR. H. WINNETT ORR, of Lincoln, Nebraska, who spoke on the subject "The Relationship of the New Antiseptics to the Treatment of Infected Wounds and Septicemia."

Since Lister's time, we have been looking for the ideal antiseptic. Koch and Pasteur interested Lister in the search for such a compound. Maybe the compound will be found, but as yet it probably is not known, although it may be on our shelves.

A great deal of laboratory work has been done and the ideas have been transferred from the work in vitro to clinical surgery. This reference is made especially to the recent experiences with the sulpha compounds.

Probably the Carrel-Dakin method was one of the last of the most effective methods and represents in essence an elaboration of Lister's original idea; of course, the method has been successful in many instances, but it has been most harrassing and disturbing to many patients.

In the past war, Col. Gray advised an attack rather than defense in reference to the treatment of infected wounds. However, there are other elements. Thomas advocated enforced, uninterrupted and prolonged rest. Hilton also advised rest.

Lister in 1867 described seven cases treated by an antiseptic method. He recognized, however, that there were other effects that might bear on the recovery of the patient, besides chemicals, that is that there were natural defenses.

Another important point is restoration of natural relationship of structures. One important application of this principle was the use of Lane plates and also the Albee grafts. Sherman attributed most of his good results to the Carrel-Dakin method, but he also made prompt restoration of the structures involved—this latter is a most important contribution.

The essayist preferred indirect fixation—probably this is more satisfactory to the patient and gives better chance for prompt recovery.

Without any method of antisepsis or cleansing used in conjunction with primary closures, a certain number of complicated cases will result.

Drainage by rubber tubes was also practiced by Lister. Senn questioned the advisability of results when so much tissue damage was involved by the use of tubes; the tubes also may become a culture medium.

The essayist, himself, uses no tubes nor sutures; use is made of tincture of iodine as a primary fixative.

One of the great difficulties is the mixed infection which occurs, and which is serious, as emphasized by Kanavel. If confined to the original infection, a more speedy recovery results.

If proper early treatment is instituted, bad odors can be avoided in most instances. It must be recognized that certain types of infection cause objectionable odors.

We must always keep in mind the importance of helping the patient's physiological reactions, rather than to depend too much on chemicals.

Informal discussion of Dr. Orr's paper was given by DR. JAMES A. VALENTINE, DR. ROLAND A. JACOBSON, DR. A. A. GARSIDE, DR. CHARLES O'DONAHUE, and DR. FREDERICK W. SLOBE.

An Inquiry Concerning the Cause of the Endemial Colic of Devonshire

By SIR GEORGE BAKER, BART., M.D., F.R.A. AND F.A.S.

Read at The College of Physicians, London, 1767

[EXPLANATORY—I was graciously presented last summer with a copy of Sir George Baker's Medical Tract I, bearing the title hereabove. The transcription was made from an old tome in the Welch Library at Johns Hopkins University by Mrs. Aura B. Smiley of the Department of Public Health Administration in the School of Hygiene and Public Health, who writes, "I copied spelling, punctuation and all, as you see, very faithfully." Her sister, Mrs. Marjorie B. Berry of Chillicothe, Ohio, translated the Latin and French portions, the former of a difficult synthetic Latin style.

Most of the original Tract is in English—the professional and scientific English of the period. It is a medical classic, not only because of the thorough and logical way in which the subject is treated, but also for its exactness of expression, even though in the cumbersome English of the mid-eighteenth century. There are also frequent allusions to the wine-using countries of the Continent.

The Medical Tracts were "Collected and Published By His Son, London. Printed by Bulmer and Co., Cleveland Row, St. James, and sold by Payne and Foss, Pall Mall. 1818."

The copy with which I am favored comprises 50 typed pages, 8½ by 11, double spaced, with many interspersed translations. I have thought it well worth an extended abstract for publication in INDUSTRIAL MEDICINE. I have endeavored to retain the more fascinating passages, many of them in quotations.

The reader will discern that the men of that day faced a mountain of difficulties to prove an issue. It will also be seen how a fearful and widespread "endemial disease" was proved to be due to making or storing "cyder" or "must" in leadened containers or directly adulterating it with sugar of lead to sweeten it. —EMERY R. HAYHURST]

A VERY small acquaintance with the writings of physicians is sufficient to convince us, that much labour and ingenuity have been most unprofitably bestowed on the investigation of remote and obscure causes: while those which are immediate and obvious, and which must necessarily be admitted, as soon as discovered, have been too frequently overlooked and disregarded. Such a spirit of refinement in theory has, in several instances, been the parent of dangerous errors in practice: men are apt to be as partial to their own conceits, as to their own offspring; and those opinions seldom fail to govern at the bed-side, which have been the result of much contemplation in the closet. It is with true pleasure I acknowledge, that this spirit is a fault, not so much to be imputed to the present, as to the last age. We have now learned not to indulge ourselves in visionary speculations, but to attend closely to nature. We observe diseases in themselves; and trace the powers of medicines in their effects on the human body; and experiment is the great *basis* of our reasoning. In many cases, indeed, from our very limited knowledge we are still obliged to allow, in some degree, the doctrine of the empiric sect. Not to be concerned about what causes a disease, but what does away with (it); yet are we far from being such empirics, in the modern sense of the word, as to pay no regard to those causes, which are manifest and within our reach; such causes more especially, as lead us directly either to the cure of diseases, or, what is more desirable, to the prevention of them."

Referring to this "endemial" disorder of his day, Sir George states that the earliest accounts of the Devonshire colic of which he had knowledge, occurred in Dr. William Musgrave's "Treatise on Symtomatic Arthritis" published in 1703, which, he stated, was caused "by unripe and sour pomace" (apple or other fruit mash) used too freely, since it disturbed only those who are habituated to this drink, and in proportion to their habituation; also, that the colic thrives in those seasons which abound in pomace, but which was rarely observed when the fruit goddess Pomona denied an abundance.

Dr. Baker comments that it seems peculiar that Dr. Musgrave should have dwelt so much on the colic, which he represented as due to the effect of "crude and sharp cyder," and made no mention of those essential and pathognomonic symptoms, by which it was distinguished (in 1767), especially since Dr. Musgrave also wrote about the colic "of the pictones" in which the victims contracted paralysis and became thin, with withered joints and invalided for the rest of life; also, that just before the paralysis began there occurred "erratic, un-fixed aches . . . torturing the internodes now of these, now of those joints, raging most violently in the autumn and in rainy weather, and assuming the character of rheumatism." However, orchards were apparently not much cultivated near Exeter where Dr. Musgrave resided and no county hospital had as yet been established there.

Dr. Huxham also testified in the year 1739 that there was 10 times more "cyder" made and drunk in the county at that time than there had been some 30 or 40 years before. In fact, Dr. Huxham, in his "small work on the colic-like disease of the Devonians," wrote that in the beginning of the autumn of 1724, a season particularly remarkable for an abundance of apples, the colic spread itself all over the county of Devon, and especially among those who were not very elegant and careful in

their diet. "It infests that county more or less every autumn." In 1728, Dr. Huxham was studying the colic in relation to "the air and epidemic diseases," and, particularly, to northerly winds, but he also found it was "equally violent in dry and moist weather, during the prevalency of a south or a north wind."

"Any intelligent reader, who shall peruse Dr. Huxham's description, will readily determine the *morbus colicus Damnoniorum* (colic disease of the Devonians) to be precisely the same disease" described by Francis Citois in 1617. Citois was a native of Poictiers in France. He described "a new colic-like, bilious ailment common among the Pictones." Dr. Huxham also found the disease very common in the West Indies, at least in description, where it was laid to great use of "very acid juice of lemons." It was Dr. Huxham's theory that the colic was principally due to "a very gross, essential acid salt, or tartar" from the juice of apples. In the year 1724, even "the swine-hogs, as well as the swine-men, suffered from the gluttonous abuse of the apples; and all of them wasted greatly in their flesh, and many died."

For explanation, Dr. Huxham elaborated the theory of crude, gross tartar causing the blood to become very acrid, as well as all the humours thence secreted, by which the very soft, lubricating mucus separated by the glands, discovered by Dr. Havers, became a sharp, coagulated matter, from which arose great pains in the joints. Likewise, the soft lymph moistening the nerves became a "corrosive ichor, and hence epileptical attacks." The blood molecules became attracted to each other and too large to pass through lymphatic arteries or even the sanguineous capillaries, resulting in obstructions and great irritation of the nervous extremities. "At length, even the very bile . . . . becomes corrupted and quite enervated by the super-abundant apple-acid, though in its natural state it was designed to correct acidity." Thus the bile stagnates in the gall-bladder and hepatic ducts, where, because of "the heat of the body and agitation by the motion of the circumjacent parts, it is again dissolved and grows daily more and more thin and acrid," permitting it to be resorbed in the blood where it occasions pains, anxieties, and spasms, also corrodes the tender vessels and is greatly injurious to the brain. "When it passes into the guts, it occasions vomiting and colic." In a saving clause, Dr. Huxham remarks, "Without proof every theory, no matter how fine it may be, is worthless."

At this point, Dr. Baker observes that this colic of Devonshire is precisely the same disease which is the specific effect of all saturnine preparations, "and that there is not the least analogy between the juice of apples, and the poison of lead." "Lead itself being certainly of such a nature, as to be abundantly answerable for all the ill effects, complained of from the cyder, my thoughts were naturally carried to the search of it." He found a book by an anonymous author entitled, "T. Tronchin on the colic of Poitou," in which occurred the statement—

> "It is possible that the wines of which Citois speaks and the ciders of which Mr. Huxham speaks were, without their having been able to discover it, adulterated with litharge or some other similar substance."

However, this anonymous author later states that, despite M. Tronchin, the bile, the poisonous mineral substances and harsh, green wines, although different in appearance, produce colics almost of the same kind.

Dr. Huxham, who compared Devonshire cyder with Rhenish and Moselle wines, found them to agree in containing abundance of crude tartareous salt, but that it had not been shown that they ever produced "the colic of Poitou," in an unadulterated state.

Dr. Baker says that it is certain that the colic of Poitou has been common in the countries where those wines are much drunk, but is also certain that the merchants have long practiced the art of adulterating them with litharge.

Why is the colic of Poitou very little known in the eastern countries, where the Turks, whose religion obliges them to abstain from wine, drink large quantities of a very acid sherbet? "Does the experience of jockeys, who, in order to reduce themselves to a certain standard of weight by sweating, are said to drink largely of vinegar, strengthen such an observation?" "Do we find it to be true, that children, and valetudinary people, and particularly chlorotic girls, whose first passages abound with acid, are on that account subject to this species of colic? Is not a *diarrhoea* or *cholera*, the ordinary effect of *the immoderate and very long use of the summer and autumnal fruits?* And is it not a common observation, that Must relaxes and liquefies, and, if drunk largely, is apt to produce dangerous fluxes?"

"What reason can be given, why the poorer inhabitants of the counties of Worcester, Gloucester, and Hereford, who use, as their common drink, a weak acid cyder, are subject to no such colic?" Sir George chidingly asks whether this is because the apples in Devonshire do not ripen so readily because the trees are planted too near to each other, while the opposite is true in the neighboring counties; or, because in the neighboring counties, the apples are kept until they are rotten, by which means the acid is subdued, and becomes innocent; or, that, is it due to *the moisture exhaled from the vast Atlantic Ocean*, in order to shew, why the air of Devonshire is unwholesome, and the apples sour? How explain the experience of the inhabitants of Scotland who drink large quantities of a small beer, "even in the act of fermentation, without producing an epidemic colic. Why is this disease no longer endemic in the province of Poitou. Is that the grapes are brought to more maturity, than they were formerly? "Has the sun more power now, than in the time of Citois?" Is it reasonable that the essential salt of a vinous liquor

> "can raise such tumults in the bowels . . . when it is vulgarly known even among the workers of the lead mines in Derbyshire, that patients, afflicted with this disease, do not receive a more immediate,

> or a more effectual relief from any medicine whatever, than by taking large and repeated doses of this very essential salt, the *cremor tartari*; and when it appears that Dr. Hillary greatly depended on it, for the cure of the dry-belly-ach, in the West-Indies? And lastly, can we possibly allow, that a cause, *similar in its nature to the acid of lemons*, is productive of this disease in our own country; after having been informed both from the West-Indies, and the colonies of North America, that the juice of lemons and limes is not only much trusted to for its cure, but that it is even esteemed to be a preservative from it?"

Zeller, in his "Doctrines, indications, causes, and harmful effects of wine adulterated with litharge," gives an account of the revival of the adulteration of wine by litharge in the duchy of Wirtemburg, in the beginning of the present century. At the same time, the inhibitants of Tubingen had long drunk their wines as acid as vinegar, with impunity, till this fraud was introduced. Indeed, those who did not buy wine from inns or drink it in the rooms of inns, "escaped unharmed from those griping pains and suffering." Those "whom sweetness enticed (because of adulteration with litharge) either suffering wretchedly—unnerved, rendered feeble, the joints shaky and uncertain when they move—or succumbing to death. For a great many have died in anguish."

Physicians who have resided in the hotter countries testify that there are no better remedies against spasms, dysenteries, and the other endemeal diseases in those climates, than the acid vegetables. Jacobus Bontius (India) dilates upon their use against violent dysentery and cholera—usually originating with the bile. Nature seems to point with her finger to many sour and astringent herbs of local growth as counter remedies. From these and similar observations, Sir George deduces that the cause of Devonshire colic is "not to be sought for in the mere acid cyder; but in some adventitious, either fraudulent, or accidental, adulteration with lead."

He found that the disease was very common all over the County of Devon and particularly where the greatest quantities of cyder were made; that it was common to all classes of inhabitants whether they drank the unfermented or the new cyder; that it was more frequent here than in other parts of England and that it was not entirely confined to the autumnal season. He found, throughout the town, people who were just like ghosts or statues, "walking artificially, pallid, squallid, lean," with "their hands crooked and hanging under their own weight, not being raised to the mouth and other higher parts except by effort (practice, skill); their feet not their own, but the muscles of their shanks making their gait laughable if (it were) not so pitiable, their voice harsh and halting."

"Sept. 1762 to Sept. 1763	72
Sept. 1763 to 1764	75
Sept. 1764 to Lady-Day 1766	86
Lady-Day 1766 to July 6, 1767	52
	285

Of this number 209 were cured."

From Dr. Andrew, of Exeter, he received the foregoing account of all the patients with this disease who were received into the Devon and Exeter hospital since September 1762.

Dr. Andrew instructs that the most violent symptoms, such as pain and costiveness, are generally removed before the sick are brought to the hospital; and that nothing commonly remains but a paralytic weakness in the arms. When the disease proves obstinate, endeavor is made to get the patients in the hospital at Bath where the water, though not specific, is esteemed the most effectual remedy both internally and externally.

Six George found that 80 patients had been so removed to the Bath hospital in the last year of whom 40 were said to have been cured, and 36 greatly relieved. He was assured that the patients from Devonshire, compared to those from Hereford, Gloucester, and Worcester were generally as eight to one. A Dr. Wall, of Worcester, assured him that there was no lead used in any part of the apparatus for grinding or pressing the apples, or fermenting the liquor in the three counties named. However, in one instance, a farmer filled a large leaden cistern, with the consequence that all who drank of it "were affected by it as lead workers usually are. We had 11 of them, at one time, in our infirmary." (He cites two or three less conspicuous incidences: A physician of Worcester "who was much employed in the cure of lunatics" observed "that more lunatics came from Herefordshire than any other place. This fact, if true, may possibly arise from the quantity drunk rather than the quality.")

It was next found that the apparatus for making cyder differed greatly in different counties. According to Dr. Wall, in Hereford, Gloucester, and Worcester, the cyder mills ranged from 16 to 20 feet in diameter, and consisted of several pieces of stone or timber joined together by iron clamps fastened with lead, but the cramps were fixed only in the bed of the mill or outside of the curb and not in the groove where the apples were ground, from which it was doubtful whether more than mere traces of the lead might be accidently dissolved in the cyder.

On the other hand, in many parts of Devonshire, the "trough used in grinding the apples is composed of several pieces of moor-stone, cramped together with iron, and fixed by melted lead, poured into the insterstices," and "chasms are filled up with lead," so that the apples "come immediately into contact with no small quantity of this poisonous mineral." In several parts of the county it was common to line the cyder-presses entirely with lead to prevent leaking; in other places, to nail lead sheet over cracks or joints, and to convey the juice from the presses in leaden pipes. Even the farmers who made weak cyder early in the year before the apples were ripe, put leaden weights into the casks to prevent the liquor from souring—this cyder being the common drink of their servants and labourers. Such a pernicious method of adulteration would be a crime punished by death in both France and Germany. He does not believe it is practiced with any conscious-

ness of the mischief of it in Devonshire. Still "it is certainly common with dealers, when the liquor frets too much, and is thereby in danger of becoming acetous, to rack it into leaden cisterns." Even this has been likewise practised in Herefordshire. In fact, the use of cerusse, in correcting acidity, is well known by the farmers and merchants.

Phillips, in his excellent Georgic, wrote:

> "nor let the crude humours dance in heated brass, steaming with fire intense; although Devonia much commend the use of strengthening Vulcan."

In treating wines, Virgil (Georg. lib. i. ver. 295):

> "Or with Vulcan boils down the liquid of the sweet must And with leaves skims off the foam of the bubbling brass (kettle),"

and in another place (Georg. lib. iv. ver. 269):

> "the thich must boiled down with much fire."

Dr. Baker next goes into the methods of wine making in Spain, Hungary and Italy, the latter employing the methods of thickening new-made musts over a low flame by which they acquired greater sweetness, whereas boiling was the creator of too much acidity (quoting various authorities). He observes it to be customary in almost every country to make the upper parts of the boiling vessel out of lead, so as to increase the capacity at a less expense in the part where the content is not exposed to the fire, but he believes that some of it must trickle down into the boiling juice, especially as the cyder is often made in Devonshire. In a gentleman's family, some sour cyder was boiled with honey in a brewing vessel capped with lead. All who drank this liquor were seized with this disease and one of the servants soon died in convulsions while several others were cruelly tortured for a long time, and the master himself, despite all the assistance which art could give him, died miserably after three years of languishing under a most tedious and incurable malady.

Very lately, there was, on the estate of his grace, the Duke of Somerset, a leaden cistern of very large capacity used for holding the apple juice until it was fit to be removed into casts.

"At last it was discovered, that this was a most pernicious practice; for that those, who drank the cyder, thus prepared, were most cruelly tormented by the Devonshire colic; and that many died. The leaden cistern, therefore was no longer used; and, in consequence, the disease became less frequent among the inhabitants of Bury Pomeroy."

But Dr. Baker cites another incidence of a gentleman of the county of Devon who long practiced in his own family the restraining of the fermentation of cyder by throwing into it a certain quantity of sugar of lead, and was by no means convinced that any ill consequences ever followed this practice and that his family were not more subject to colic than the neighbors.

There is also no doubt that the practice of sweetening cyder as well as wines by this method is secretly done and too much practiced in every part of the kingdom. He cites a small "*compendium* of housewifery," by one William Graham, late of Ware in Herefordshire: "Under the article of *Secrets belonging to the mystery of Vintners*, page 30, I have lately found the two following receipts—

> "*To hinder wine from turning*—Put a pound of melted lead in fair water into your cask, pretty warm; and stop it close."
> "*To soften green wine*—Put in a little vinegar wherein litharge has been well steeped, and boil some honey to draw out the wax. Strain it through a cloth and put a quart of it into a tierce: and this will mend it, in summer especially."

Says Sir George:

> "This little book, having gone through six editions, may be supposed already to have done some mischief; and the editor of it would act humanely, if he would, in future editions, not only suppress the secrets of the mystery of vintners, but shew how dangerous such receipts may be to the health of mankind."

To satisfy himself whether there was any lead in the cyder of Devonshire, he procured, in the month of October, 1766, at Exeter, some expressed juice of apples as it flowed from a cyder-press, lined with lead, testing with "the volatile tincture of sulphur," and satisfied himself that the Must did contain a solution of lead. He repeated the experiment on cyder made in the preceding year and "this likewise shewed evident signs of lead contained in it."

> "But, being unwilling to come to any decisive conclusion, solely on the authority of my own trials; more especially as I had been under the influence of a preconceived opinion; I brought with me to London some of the same Must, which I had examined at Exeter, in a vessel of stoneware. This Must, together with some Devonshire cyder of the preceding year, purchased of the maker (who assured me that he used no lead in any part of the *apparatus*, except only what was applied in composing the trough, as was mentioned above) were the subject of the first five experiments, which will hereafter be described. In making these, as well as several others, on the same subject, Dr. Saunders kindly gave me his assistance."

Sir George next comments upon chemical theories of the day and their applications and tests, especially for lead in vegetable acid solutions, to which it had been added to cover their acidity—"a sweetness is communicated to them."

> "The richer wines, of which the original juice contains a large proportion of saccharine matter, are less liable to adulterations of this kind, than the poorer wines of the northern climates, such as the Rhenish and the Moselle wines, and our English cyder."

Thus, in the case of wines, a condition of *saccharum saturni* results from the addition of lead.

> "By attentively observing the variety of changes produced by certain bodies, when added to a solution of *saccharum saturni*; and by applying these observations to the wines, which are the most frequent subjects of this adulteration, chemists have been able to detect such frauds, wherever they have existed. We now proceed to our experiments."
>
> EXPERIMENT I
>
> "A small quantity of Devonshire cyder being exposed upon clean paper to the fumes of the tincture of sulphur, became immediately of a darkish color. and we could only imitate this colour by exposing a dilute solution of *saccharum saturni* to the same fumes. A small quantity of Herefordshire cyder,

exposed in like manner to the same fumes, exhibited no such appearance, until a few drops of a solution of *saccharum saturni* were added to it."—*Observation I*: It was the precipitate of the lead united with the sulphur which produced the dark colour.

EXPERIMENT II

"A small quantity of *hepar sulphuris* (Prepared by digesting together in a sand-heat one ounce of orpiment, and two ounces of quick lime, with twelve ounces of water, in a close vessel) being added to some Devonshire cyder, in a few minutes occasioned a darkish colour in the body of the liquor and the whole became very opaque. No such change was produced in the cyder of the county of Hereford, until a few drops of *saccharum saturni* were infused; when the same appearance likewise was perceived." *Observation II*—The reasoning made use of in the former observation, is applicable here. The decomposition of the *saccharum saturni* and of the *hepar sulphuris* was effected by the same laws of elective attraction.

EXPERIMENT III

"To a small quantity of Devonshire cyder were added a few drops of *hepar sulphuris* which, this time, was prepared by boiling equal parts of fixed vegetable alkali and sulphur together in water. Precipitation of a very dark colour was produced. "When Herefordshire cyder was treated in the same manner, the precipitate produced was as white as milk; and it was only upon the addition of a few drops of a dilute solution of *saccharum saturni* that a precipitate of the same colour with the former could be obtained."—*Observation III*: "There is some nicety required in making this experiment." The proportions of the added substances must be controlled (as described). "If a large quantity of *hepar sulphuris* be at once added the whiteness of the too copious precipitate is such, as to render the dark colour of what is first precipitated imperceptible."

EXPERIMENT IV

"Some Devonshire cyder was examined by means of the volatile tincture of sulphur, as in Experiment III; a very dark coloured precipitate was obtained. A similar precipitate could not be obtained from Herefordshire cyder, until a weak solution of *saccharum saturni* had been added to it. —Some of the Must (taken from the press in the parish of Alphington) treated in the same manner, produced precipitates of a deeper dark colour. This sufficiently shews, that the solution of lead in the Must, was stronger than that in the cyder." Hence, "it should seem probable, that the lead was incorporated with the Must; and that, as the acid, during the fermentation, is in a great measure converted into alcohol, a proportional quantity of lead would necessarily be precipitated."

Sir George next carried out experiments with different samples of cyders from different places, substantiating the presence or absence of lead accordingly. The experiments of Professor Gaubius showed that the detection of the adulteration of wines (with lead), by means of vitriolic or muriatic acids, was less conclusive than those described.

EXPERIMENT V

"In order to put the matter entirely out of doubt, an extract was made from eighteen common quart bottles of Devonshire cyder of the preceding year (first strained through a linen cloth) which had been in my cellar more than three months, but had been only a fortnight in bottles. This extract, being assayed with the black flux, a quantity of lead, weighing four grains and a half, was found at the bottom of the crucible."

Here Sir George got into difficulty because two small granules of lead were found in the extract made from the 18 bottles of Devonshire cyder, which, it was immediately suspected, were no other than *shot* used for the purpose of cleaning the bottles and left in by accident. This necessitated throwing away the extract. Further, more straining of the cyder through a cloth had shown two or three such granules of lead. So the tests were next applied:

"to some of the same cyder, taken from a bottle, which, we were sure, had not contained any *shot*: for the bottle was very carefully examined, after having been broken in the presence of several gentlemen. The change of colour on the application of the tests, was precisely the same, as in the former experiments. However, in order to obviate all cavil, another experiment was made." This "was performed entirely under the direction and management of Mr. Hewson. The latter part was performed by Dr. Saunders, in the presence of Mr. Hewson, and of Dr. Ruston."

EXPERIMENT VI

"Two pounds of pearl-ashes were dissolved in water; and the solution, having been filtered, was added to three gallons of Devonshire cyder, drawn from a cask. The liquor became turbid, showing marks of a precipitation. It was then filtered: and the filtering papers, together with the powder, which was left on them, were burnt in a brass mortar, and afterwards burnt in a crucible, being stirred with an iron spatula in order to promote the union of the particles. The contents of the crucible were then exposed on a sheet of clean paper, and were carefully examined. Some very small globules were here found; which, being melted in a clean crucible, were reduced in one mass, which was evidently maleable lead. The quantity was a little more than one grain."

Next, experiments were carried out "to determine, what proportion *saccharum saturni* bears to lead." Four ounces of *saccharum saturni* yielded one ounce and seven drachms of malleable lead.

Dr. Baker next refers to German experiments made "in the latter end of the last century" by physicians particularly Vicarious, Cockelius and Brunnerus) to discover the true cause of the epidemic colic. When these physicians "had at last demonstrated that this disorder was wholly to be referred to small acid wines, adulterated with litharge, there appeared a certain writer, a physician of Copenhagen, who endeavoured to exhibit a specimen of his reading and ingenuity, by maintaining a bold paradox. This man, in very pompous language, and with an air of the greatest confidence, asserted in his *Triumphus Lithargyriatorum*, that no danger was to be apprehended from wines in which litharge was dissolved; and that all the ill effects, supposed to have been derived from that cause, were really to be attributed to the austere acid of wine made of unripe grapes. This opinion he endeavoured to defend by the authority of Drawitzius, Sennertus, Van Helmont, Theodorus Zwinger, Wepfer, Boyle, and others.

In a footnote, Sir George states:

"It is recorded of this physician, whose name was Seerup, that, although, in reality a man of very moderate parts, and less learning, he, by means of certain authoritative, over bearing, dictatorial manner, both in his writings and common conversation, passed among many of his countrymen and some foreigners, as a person of the most extraordinary abilities, and a perfect oracle in physic:

that, thus flattered, he grew old in error and in obstinacy; his vanity and self-importance never suffering him to abandon any opinion, which, through ignorance and inexperience, he had once adopted. It is no wonder, therefore, that the reputation of this man's writings did not long survive the author."

Dr. Baker next elaborates on the contentions, but at the same time, the ridiculousness of the conclusions of Dr. Seerup and observes:

"there is no one, at this time of day, likely to revive the argument of Seerup, and still to insist on the deleterious quality of the acid: for a poison is discovered, which is experimentally known to be adequate to all those dreadful effects so pathetically described by Dr. Huxham. It is likewise presumed, that no opinion, unsupported by facts, by experience, or analogy (how respectable soever the character of its author may be) will be admitted in evidence, in contradiction to the authority of a fact, for which we have the decisive and indisputable testimony of our senses."

The use of lead as a medicament is next attacked:

"Yet surely physicians can not be too cautious in avoiding the use of medicines, the effect of which for aught that they can presume to ascertain, may be more formidable than the very diseases to which they are opposed." —"That preparations of lead were formerly very fashionable medicines, we may judge from the oldest dispensatories; in which we find an almost infinite number of magisteries, elixirs, and balsams, that have that metal for their basis. We are informed by Mr. Haen, that the use of these medicines is much more common even now, than is generally imagined."

Even the practice of the Chinese of that day is taken up, "Who very frequently administer internally various preparations of lead, to which they ascribe extraordinary virtues."

There next came up the matter that Dr. Huxham found it difficult to allege the reason, "Why the juice of apples in one year produces a costive belly, with violent colical pains; in another a loose belly with scarce any gripes attending." (Considerable space is given to this discussion and, among other citations, a reference to Mr. James Wilson in the *Essays and Observations, physical and literary,* published at Edinburgh, referring to

"miners' Mill-reek, which all the inhabitants of *lead-hills* are subject to, but particularly those, whose daily business it is to melt down the lead; and he observes, that, in the first stage of this disease, a *diarrhoea* sometimes makes a cure").

The next question: How does it happen

"that all, who drink this liquor, do not suffer in proportion to the quantity of the poison swallowed; and that some people, who have long accustomed themselves to it, have never experienced any of its bad effects."? Dr. Baker says, "This difficulty which subsists in its full force, whatever general cause be supposed, I do not take upon me to account for: possibly it is resolveable only by recurring to that inexplicable *idiosyncrasia,* in which there is so remarkable a difference among men." Also, "the case is not singular, but exactly paralleled by that of foreign wines," as in Germany, where physicians "in the latter end of the last, and in the beginning of the present century, wrote concerning the adulterations by litharge, found reason to make the same observation." Thus, Zeller wrote: "And yet many, nay innumerable persons, had not been afflicted by this (disease) no matter in what manner—even to drunkenness—they drank that (cider), others (had been afflicted) only lightly."

SIR GEORGE states that when he first undertook the unpopular task of what appeared to him to be a most dangerous provincial error, he was well aware that much cavil and contradiction was to be expected, and that it would be very difficult to establish a truth, however clearly demonstrated, in opposition to the prejudices, the passions, and the interests of men. Accordingly, he heard of several objections to his opinions, some founded on false facts and misrepresentation, others having, at first sight a specious appearance, but, when submitted to accurate examinations, seemed to lose their validity and importance.

It was affirmed that in many parishes of Devon, the mode of pressing the apples, which he described, had gone into disuse and that, "instead of the trough and roller, a machine, commonly called the *mill-engine* or the *hand-engine,* is employed for that purpose." While he found this to be a fact in the eastern parts of the county, he found "that, although no lead enters into the structure of that machine, yet the vessel, placed to receive the apples, ground by it, is, in several parishes lined with lead." Hence the danger is not removed by substituting the mill engine for the trough and roller.

It was next suggested that the apples were frequently compressed in wooden troughs. He inquired carefully into this and found no troughs made entirely of wood, although the stone troughs were generally enlarged around the top with wood, and, here, "the two parts were joined together by means of long iron nails, driven through the wood into the stone; and melted lead is poured into the holes in the stone, with a view to fasten the juncture."

It was denied that sheet lead was nailed over any press in the county except one at Alphington. To this, Sir George replies that in the year 1766 there were cyder-presses lined with lead in several parts of the county, and is authorized so to mention. In three parishes not fewer than 30 presses were found to be lined with sheets of lead.

An experienced physician next told him that he had found several patients "received into the Devon and Exeter hospital, who laboured under the colic of Devonshire, had never drunk any cyder; and that the cyder, which others had drunk, was made in pounds, which had no lead in any part of their composition." Sir George comments that it was most improbable, where "cyder is the common drink, especially of the lower class of people in Devonshire, that an inhabitant of that county, received into an infirmary, should never have drunk any cyder." Granting it were true, "yet I would not be understood to mean, that the inhabitants of Devon are exempted from the various other means, by which experience has taught us, that the same poison will be communicated." In several counties he had "seen patients affected by the colic of Poitou," where very little or no cyder was drunk, and where "the specific cause of that colic, may by divers means be admitted into

the human body." On the other hand, when it occurs in Devon, where the colic is endemial, and "it should seem most probable, that it has been conveyed by the means of cyder; yet it cannot be doubted that various means of conveying that poison may operate there, which prevail in other counties of England."

" 'That the cyder which others had drunk, was made in pounds, which had no lead in their composition,' may likewise be admitted to be true," but as pointed out above, there is more than one way for the liquor to be adulterated with lead.

> " 'If,' says a very learned friend, 'the quantity of lead, which was obtained in your assay, were, in general, dissolved in our cyder, scare any one of our great cyder-drinkers, who must daily swallow a grain or two of dissolved lead, could escape the dry colic; and, in consequence, this county must have been long since depopulated.' " In meeting this possibility, Sir George has reason to think that the cause which he assigned is as general as the effect produced.

As to the exact quantity of lead which may be dissolved in the Devonshire cyders,

> "that I by no means undertake to determine." If the Devonshire cyders "do contain even the smallest quantity of lead, the inference, which I have drawn, will not, I think, be disputed by anyone, who knows what is the genuine, the specific operation of that mineral, when taken into the human body. And be it remembered, that, whatever cause of the endemial colic be supposed, it is undoubted, that equal quantities of that cause do not produce equal effects on all constitutions; and that many great cyder-drinkers have never been attacked by the disease." Furthermore the argument, "urged by my friend, against a metallic solution, will be as valid against the poisonous acid." In either case the county might have been depopulated.
> "The same gentleman insists, that the servants of those farmers who have a great deal of lead in their pounds and presses, are not more subject to the colic, than those of their fellow parishioners, who use no lead at all; and that the servants and laborers of those who make very poor crude, sour, cyder are, of all persons, the most afflicted by this disease. The first part of this evidence is directly contradicted by that of several persons of accuracy, who have communicated to me their observations," including a Dr. Wall who, "in a cyder county, where the dry colic is almost unknown, attended several patients, under that disease," but found they had drunk cyder, adulterated by means of sheet lead, nailed over a press, so that they "*were effected by it, as the lead workers usually are.*"

Dr. Ingen-Housz, who was very lately in Normandy, was informed that no lead was employed in the apparatus for making cyder there, but that in the hospital in Rouen there were generally many patients, "under the colic of Poitou, such as potters, painters and other workers of lead: but that there is in Normandy no endemial colic, which can be attributed to cyder."

> Finally, "if crude sour cyder be most productive of the colic, the reason is, not only because the greatest acidity of the solvent will produce the strongest metallic solution; but likewise because both farmers and dealers in cyder have unfortunately learned, that, among all the various things, which have been tried, lead is the most certain and effectual corrector of the sourness and austerity of their cyder."

At this point is appended an interesting foot note:

> "I here appeal to the conscience of one person, in particular, whose zeal has induced him to oppose my opinion in print, whether it be not true that he has for many years sold sugar of lead to the farmers for the purpose of correcting sour cyder?"

There next came the question about the accuracy of test results, and whether iron might be confused, but Sir George answers that solutions of iron, whether strong or dilute, in vegetable acids, mineral waters, or cyders, always caused a deep black colour of more or less livid tinge, very different from a strong solution of lead which, of itself, rather made the liquor of a lighter colour. Likewise dropping the smallest quantity of either of the solutions of iron into any of the lighter chalybeate solutions, immediately made a deep inky colour, of which a solution of orpiment was the most remarkable, which might be owing to the astringency of the lime-water in that composition. In contrast, solutions of lead made no tinge of an inky colour, but constantly, more or less of a dark brown colour.

When a strong infusion of an astringent vegetable was poured on solutions of iron and lead in the same cyder, in the smallest equal quantities, the iron was immediately changed to an inky colour but the lead showed no discolouration. "It may therefore be fairly concluded, that the smallest quantity of iron can hardly exist in cyder, without being discovered both by the solution of orpiment, and an astringent vegetable infusion." If an astringent vegetable infusion makes no change in colour when added to cyder, but changes to a brownish colour on the addition of a solution of orpiment, that at once shows an impregnation of lead, which is true even if iron is present, because of a difference in colours which results. The difference is as great as that between ink and Madeira wine, "and consequently can never deceive persons, conversant with such experiments." It may further be observed that when astringent infusions are applied to solutions of iron, upon standing, these become blacker, but solutions of lead, thus treated, seldom change to a darker colour; also, this colour does not heighten if more of the tests (test solutions) are added, thus contrasting with the tests applied to solutions of iron.

"In fine, it has been shewn, that a solution of lead is frequently to be discovered in the cyder of Devon. The various means, by which this liquor may be supposed to be thus adulterated, have been pointed out. That this is a cause sufficient to produce the Devonshire colic, cannot be controverted; and it seems to me most probable, that, as it is adequate to the effect, so it is the sole cause of that disease. Does not such a supposition appear to be agreeable to the general simplicity and uniformity of nature? In this opinion, however, I may have erred; but I shall be happy even in my error, if it shall excite some more successful inquirer to investigate, and to discover a truth of so much real importance to human society, and particularly so to the inhabitants of those parts of the world, in which this very formidable disease is endemial."

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Making It Hum!

WHEN industrial medicine was being critical, only a few years ago, as more curative than preventive, it might have replied in the manner of the self-made American industrialist who heard a visiting lecturer from Europe deplore our lack of "culture." He said: "Wait till we get around to culture. We'll make it hum!" At any rate, that is what the industrial physicians are now doing with things preventive. DR. LYNCH's Address (page 226) mentions the direction of some of the work along this line. The elimination of hazards to life and health, or, where they can't be eliminated, their control; the reduction of accidents, at work, and at home; the study of illnesses which, although they are entirely non-occupational, "deprive industry annually of 2¼ billions of productive man-hours;" the study of the defects of the younger men coming into industry, with a view toward their proper placement; the protection of workers against the spread and the intrusion of communicable disease; the anticipation of fatigue; the problems of community health; the special study of the diseases incident to the process of aging; the analysis of the latent talents and capacity of the handicapped; even the emotional reactions of the individual to the mental and physical stresses of present-day existence — these are several of the things involved in prevention. They are all being studied. Almost every meeting of industrial medical men evolves a progress report on one or another of their many phases. Or, quietly, and on his own, an industrial physician somewhere is studying, analyzing, tabulating, comparing—getting ready to add his results to those obtained by others, to the end that the problem may be better understood and the solution brought nearer.

DR. DIGNAM's "Survey of Non-Occupational Injuries and Illnesses in a Major Carpet Mill for 1940" (page 242) in an example. The fact of the huge wastage caused by absenteeism on this account has been repeatedly verified; the mounting statistics have pretty well settled upon the measurement used recently by DR. SEEGER, Chairman of the A.M.A. Council on Industrial Health, namely, eight days a year on the average for every male worker, 12 for every female. The work of DR. R. R. SAYERS, DR. C. D. SELBY, and others, has been outstanding in the development of information on this subject. Indeed, it was for his studies on absenteeism that DR. SAYERS was given the Knudsen Award for 1941-42. But more of that in an early issue. Meanwhile, men like DR. DIGNAM, acknowledging the fact, were investigating the causes.

And in other phases, others were busy — DR. EDWARD J. STIEGLITZ, of U. S. Public Health Service, and DR. SAWYER, of Eastman Kodak, on the problems of the aging; DR. LYDIA GIBERSON, of Metropolitan Life, on the worried employee; DR. HEDWIG KUHN, of Hammond, Indiana, on workers' eyes. . . . And many, many others, for the list is long.

We wish we could look in upon them all. . . .

Well Done!

THE first four articles in this issue are from the proceedings of the Twenty-Sixth Annual Meeting of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS at Pittsburgh last month. We do not hesitate to characterize them as, in all respects, beyond praise. In every quality that contributes to excellence, they are superb. And yet they are, perhaps, no better in individual merits than any other of the more than fifty presentations at the same meeting. All were more than good; each was outstanding. The point is that men write well when they have something to say, and particularly well when what they have to say is bound up with the life of the heart and the career of the mind. And when their subject matter evidences the successful results of their own constructive thoughts and ability, they reach the heights.

These four articles, of course, and the others of the more than fifty above mentioned, are not the only ones, in this issue or in previous issues of INDUSTRIAL MEDICINE, of which these things can be said. It has been our privilege to publish many articles which also deserved unstinted praise as contributions to medical literature, both medical and literary; and we have often seen to it that such praise was given. The fact, however, that so many presentations of the kind could come together at one meeting means something. It means that industrial medicine and industrial hygiene have not only arrived at their objectives but have also, and most substantially consolidated their positions.

It was a big thing that the founders undertook —"that handful of pioneers," as DR. LYNCH says, "who formed this Association at Detroit in 1916: DRS. CROWDER, GEIER, HARVEY, PENBERTHY, SAWYER, SELBY, SHOUDY, WATSON, and others . . . It was no easy task." But it was well done. "Over the years we have seen the evolution of the industrial health program, conceived and born in the minds of humanitarian physicians and executives, nourished in the field of traumatic surgery, embracing accident prevention as a natural corollary, widening to the study and control of occupational diseases, the pre-placement and periodic health examination, and now, combining all these with the benefits of preventive medicine and industrial hygiene."

Well done, indeed! As well done as anything in any department of medicine. And the addresses, papers, presentations and reports of those who have done it, telling of what they did and how they did it, are evidence of how well it was done. We are proud that it is our privilege to put those addresses, papers, presentations and reports in form of permanence on the printed page.

LETTERS

The "Historical Milestones"

TO THE EDITORS:

[I am enclosing a letter received from DR. REDWAY which you might find of interest in connection with the recent story of the publishing efforts of Ellenbog.

—A. H. WHITTAKER, M.D.]

IN LOOKING over your article on "Historical Milestones," pages 203-204 of the May issue of INDUSTRIAL MEDICINE, I was much interested in the reproduction of the wood cut on page 204. In the text you refer to the three sevens in the lower right hand corner of the cut, opposite the signature V. Engelshofen.

I have a suggestion to offer in explanation of these three sevens. In block book making as you know, both the text and illustration were cut into the same block. In this illustration you will note the border on either side with the stars in the background. These decorations serve more for the purpose of decoration than do the three sevens.

When such a block was locked in the press for printing, the tendency was often to warp under pressure of the press. Large white spaces are intaglio in the block and whereas it is possible that the stars might have been omitted without much alteration in the printing characteristic of the block, the lower right hand corner would have been without support since the border is not continued below. Such a condition of affairs often causes the block to crack and split.

I have no suggestion to offer as to why the three sevens were used except that seven was a mystic number, and may be found frequently as a carry-over from an earlier usage. However, I believe in this case the chief purpose was to prevent cracking of the block.

Having been myself a wood engraver I have encountered these difficulties in actual practice. Ornaments, and I believe the three sevens should be considered as such, are often used not so much for the purpose of decoration as for providing support for the block and a means of preventing the underlying paper from buckling under printing pressure. Such buckling oftentimes spoils the definition of the principal outline and requires very careful makeready if the best results are to be obtained from the block.

I am unable to locate any reference to Engleshofen. I should like to see more of this sort of thing, and wish to congratulate you and DR. SOBIN on your article.

—LAURENCE D. REDWAY, M.D.

Not as It Should Be

TO THE EDITORS:

HEALTH and preparedness are inseparable. There is no obvious way of dividing them into two distinct problems.

Unless the personnel is fit for their work, the job will not be well done. To permit a spreader of a serious contagious disease such as tuberculosis to remain in the Army or Navy, or to admit victims to the service is inexcusable when the means of preventing both are available.

As long ago as last July the Subcommittee on Tuberculosis of the Committee on Medicine of the National Research Council recommended chest x-rays as a routine part of every health examination. Since then the military establishment has been increased nearly three fold, by voluntary enlistment, by the induction into the Federal service of National Guardsmen and Naval Reserves, and by recruiting under the Selective Service Law.

Of the new men, only a small portion have been x-rayed. There are now in the service over a million and a quarter men who have not been x-rayed. This is not as it should be.

The above mentioned report states:

(1) At least 75% of early active tuberculosis can be discovered only by x-ray examination.

(2) About 10% of the male population of military age has active tuberculosis, most of which can be detected only by x-ray examination.

Assuming the accuracy and truth of these statements, the obvious conclusion is that 1% of a million and a quarter, or about 12,500 men now in the Federal military service have active tuberculosis and until all of the million and a quarter are x-rayed, the identity of these 12,500 will remain unknown.

There are several methods by which these men can be x-rayed and surely some of them must be available in some degree *now*, without waiting either for the perfection of new methods or for the development and manufacture of new types of equipment.

Dr. Charles-Francis Long made a very pertinent statement in his article in the August, 1940, issue of INDUSTRIAL MEDICINE. He said:

"It is important to understand that diagnostic accuracy is the one thing we refuse to surrender for reasons of either time or money."

Dr. Frank W. Burge in his report before the Philadelphia County Medical Society at Philadelphia, at the request of the Committee on National Defense of the Philadelphia County Medical Society said:

"The only methods that have had an extensive use, and with which any considerable numbers of interpreters of x-ray films have had any experience., are the 14 x 17 gelatine and paper films. Both are adequate, and only they are proved adequate, for this huge and tremendous important task."

Brig. Gen. Shelley U. Marietta in his broadcast from Washington on April 1, stated that the estimated average cost to the Federal government of a case of tuberculosis among the World War veterans has been about $10,000.

A billion dollar bill for tuberculosis resulting from the last war ought to be sufficient reason or incentive to weed out every discoverable case of tuberculosis from every rank and every branch of our military establishment.

What was excusable in 1917-18 is unforgivable today.

[THE author of the foregoing prefers to remain anonymous. He accompanies his letter with a file of newspaper clippings regarding the failure to x-ray army inductees. Concensus of opinion: (1) Military men should be x-rayed; (2) they are not being x-rayed, in spite of the fact that (3) there are rapid, inexpensive methods and apparatus available to do the job now, without further delay.]

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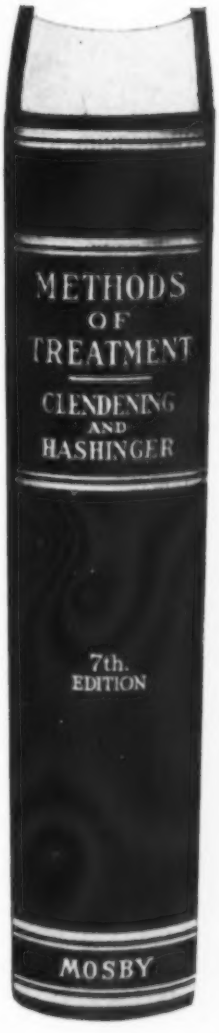

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INDUSTRIAL HEALTH AND DISEASE

Industrial Hygiene in a Public Health Program

MILTON H. KRONENBERG, M. D.,
Chief, Division of Industrial Hygiene,
Department of Public Health, State of Illinois

ANY PUBLIC health program to be successful must be rather closely integrated with the other public health activities of the community and with existing medical facilities. Whether the program be child hygiene, sanitation, tuberculosis, venereal disease or industrial hygiene, all are striving toward the same ultimate result, namely, better community health.

While such a cooperative program is of value in any health activity, it is of the utmost importance in the field of industrial hygiene, as here we must deal with the entire public health of the great majority of the adult population — those who earn their livelihood in our many industrial establishments.

In the minds of many public health workers, the term "industrial hygiene" is often construed as being synonymous with the control of diseases due to occupation. Because of this unwarranted restricted interpretation of this phase of public health there has been a lack of interest in the health problems of our industrial population, and so, the statement that the greatest unmet public health need is in the field of industrial hygiene appears justified.

Industry as we know it, not only deals with machinery, but also with men and women who are part of a community.

Modern industry comprising some 40 millions of workers in this country, who are engaged in innumerable types of work and under varying conditions of their immediate environment, which in one way or another may seriously affect the health and efficiency of these workers, has gradually given rise to many outstanding conditions influencing health, such as, overcrowding, problems in special sanitation, industrial housekeeping, fatigue, nutrition, ventilation, illumination, industrial wastes, increased frequency of ordinary diseases and illness, air pollution, occupational diseases and others. These complications of modern industry do influence morbidity and mortality rates.

The occupational diseases, although important, do not take an especially prominent place in either the morbidity or mortality experience of industrial workers. An examination of the vital statistics of industry will show that industrial workers suffer from the same diseases as the population in general. From various published statistics during the past few years we know that 10 times as much absenteeism in industry results from non-occupational diseases as from the strictly occupational diseases. This being true, we cannot content ourselves with this small fraction of the problem, nor do we have a license to exist if we are to totally neglect 90% of our load.

The present century has seen the development of the technique of disease prevention and health conservation, and has seen that technique widely applied by local, state and federal health agencies with specialized public health personnel, by a variety of organized voluntary agencies, as well as the private physician. The achievements of this organized and cooperative effort in the prevention of disease is well known to all of you.

The purpose of public health, as we view it, is to afford health protection to all the people, whether it is in the home, school or factory. Furthermore, the control of man's environment, in so far as such control re-

Read before Section on Public Health & Hygiene, Illinois State Medical Society, May 22, 1940, Peoria; published in *Illinois Medical Journal*, March, 1941.

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duces disease, conserves life or makes living safer, is a public health enterprise.

The general public have become more and more conscious of the health problems affecting workers in industry and have maintained that the guidance and protection of the health of those adults is the responsibility of public health authorities. This should be interpreted that sound public health services must be extended to our industrial population, and must deal adequately with all ages of life.

Dr. Vaughan, Health Commissioner of Detroit, states that "industrial hygiene has long flirted with the local health officer on the periphery of his public health program." With a few noteworthy exceptions, prior to 1936 there had been much talk about industrial hygiene, but little action. Today, there are industrial hygiene divisions in 30 state, eight city and two county health departments.

As we glance back over the road traveled by our health pioneers, we observe that each few years some special public health problem seems to hold the center of the arena. It may be tuberculosis, cancer, heart disease, syphilis or mental hygiene.

This has made us all too prone to concentrate upon some one province of public health work and to create a number of independent agencies or units without any well-knit, coherent and harmonious program, which would unite them all into a broad and comprehensive campaign for the prevention of disease. Such an administrative approach can only be looked upon by an enlightened public health official as impractical and obsolete.

I am sure such a technique does not appeal to the modern public health administrator whose program must go on day after day, month after month, and year after year—so designed, as to give the full benefits to all people of his community without limitation.

Industrial hygiene should not come into public health practice as a new adventure seeking trial, but should be woven into the very fabric of the permanent health safeguards of the community. There should be no barrier to wall off industrial hygiene from sanitation, syphilis, tuberculosis, nursing, medical or other programs of the local health department.

When child hygiene became acknowledged as a distinct phase of public health effort, which brought together under one administrative division the scattered and unrelated attempts to prevent infant mortality, through pre-natal and post-natal care, through supervision of children during the pre-school age, as well as through the grade schools, we had an excellent illustration of a progressive and broadly conceived plan of attack against the causes of illness and death which overtook this age group up to the period of adolescence.

While I do not desire in the slightest to disparage or minimize the value of intensive campaigns in other public health undertakings, yet side by side with these, there should be an equally intense and unrelenting campaign to prevent the causes of ill health, premature bodily decay and death which operate after the healthy boy or girl has grown to manhood or womanhood. Why should the activities of the modern health department fail to reach that child after he leaves school and enters into the industrial and economic world? Our adult population is mobilized in industry. They can be served en masse. Why not then use this entrance as an approach to adult hygiene or industrial hygiene. Industrial hygiene bears very much the same relationship to adult health that school hygiene does to child health.

Many public health officials have failed to appreciate the opportunities which are theirs to advise employers of factory labor concerning improvements which may be made to the advantage of all concerned by the application of our present knowledge of hygiene. This is an opportunity for carrying public health into the factory.

The large industries know of such benefits and are in a position to have expert direction through the employment of competent plant physicians, but the smaller factories are not prepared or equipped to consider such health services of a preventive nature.

In Illinois, 91% of the industrial establishments employ 100 workers or less and are, therefore, not in a position to engage in a health pro-

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gram of preventive medicine, general sanitation and hygiene. This means that the great bulk of our industrial population do not have the benefit of health guidance and supervision. Prevention is dependent on the knowledge that disease occurs.

The health officer has the opportunity, therefore, to stimulate the supervision of health in industry itself. This means that the health officer should be familiar with the industries in his community and the facilities they have or do not have for promoting health.

Furthermore, the health officer already has much in common with employers and factory executives as leaders of the community, and this opportunity can be used to point out the value of health supervision to industry, its workers and the community.

In many fields of public health there are certain environmental factors which may be controlled without the conscious participation of individual citizens; such things as water supply, sewage disposal, etc., need only the general support of the taxpayer to be adequately controlled. In industrial hygiene, which is an all-inclusive adult public health program, there are numerous factors, both inside and outside the plant, as well as social and biologic considerations and others which affect the health of the industrial worker to an important degree, and if these factors were adequately supervised an improvement in the vital statistics of our adult population would unquestionably occur. Therefore, we must recognize that this type of public health activity is not impersonal like the control of some of the other environmental conditions, but involves the personal cooperation of the individuals concerned.

Many local health departments are, at present, too small from the standpoint of personnel to maintain an industrial hygiene unit. This means that such a local health department will probably never have on its staff a physician, engineer or chemist who has specialized in industrial hygiene. Usually such a locality will receive its industrial hygiene services from the state health department's division of industrial hygiene. Yet in spite of this arrangement, the local health agencies must become industrial hygiene conscious and build some form of an industrial hygiene service into the daily public health program.

Now, how to proceed to extend the advantages of industrial hygiene through the medium of local health department personnel. This procedure is the same as that employed for any other health adventures, and that is by education and training of such personnel. The necessary facilities have been established by the state health department and its staff. Here specialists in the field become the teachers to guide, direct and prepare local public health physicians, engineers and sanitarians for the discharge of their new obligations. After they are familiar with the technique of making medical and engineering observations of occupational environments and the worker, the industrial hygiene division of the state health department can supply, when necessary and indicated, in cooperation with the private physician or the plant medical director, additional medical, engineering and laboratory facilities for evaluating and appraising the problem; so that, with this factual data the local health department may continue its contacts with the industry in its jurisdiction.

LET us now consider some of the industrial hygiene services the local health agency can include in its public health program. They can furnish and discuss with plant executives, factory physicians or plant medical directors such items as:

1. Making special studies, tests or examinations which they are not equipped or qualified to perform. These services include the collection of air samples, material analysis, physical determinations of ventilation, illumination and others too numerous to mention.
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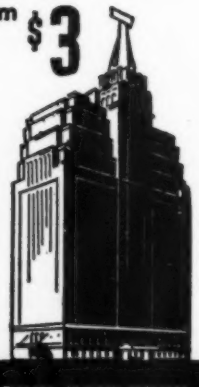

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hygiene programs in plants and setting up uniform procedures.

5. Working with and through plant medical departments to obtain specific plant improvements, better factory housekeeping, sanitation, etc.

6. Stimulate plant medical departments to concentrate on preventive measures.

7. Encourage the plant medical department to interest itself in the worker's life beyond the confines of the factory. This means personal hygiene, recreational facilities, proper diet, habits, etc. This method of health education carries with it many opportunities in a public health program for the worker and the community, as through this avenue we are also able to reach the entire family.

The above concludes in a general way what the local health departments can do to assist the local industrial establishments and so improve its program and facilitate accomplishments.

At this point, let us consider the community health assets that are at the disposal of local health departments and which can be integrated with industrial hygiene.

1. *Communicable Disease Bureau, including Tuberculosis and Venereal Disease.* Here the industrial hygiene unit can act as a case-finding agency in a large percentage of the adult population. This is of especial value in the tuberculosis and venereal disease program as we are dealing with the specific age groups where these diseases are most prevalent. When positive cases are located this information can be turned over to the specific bureaus for the investigation of contacts, home conditions and other epidemiological data. These bureaus can keep the individual under observation and see that proper precautions are taken to keep the individual non-infectious.

2. *Sanitary Bureau:* This bureau can assist materially in providing a safe water supply for human consumption and this indeed is a vital problem as many industrial plants have a dual water system—one a cheap unprotected supply for production purposes and fire protection and one for human use. In such cases it is essential that there are no cross connections providing a means of contamination.

3. *Nursing Bureau:* The field of the public health nurse and the industrial nurse is practically unlimited in industrial hygiene, as it is the nurse who undoubtedly must do most of the follow-up work and nursing supervision in the home. In the latter instance she can be of great value to the official health agency, the family physician, as well as the patient. It is she, too, who has much to do with improving home conditions and sees that orders are enforced.

One of the greatest needs of the moment for undertaking and promoting such a program is also the integration of the services of physicians in private practice. They possess an enormous latent reservoir which can be activated in the name of health education and industrial hygiene. It is urged that physicians in private practice who accept patients from industry be encouraged to work with the local health departments. They should be shown the part they play in giving a fullness and wholesomeness to the daily life of industrial workers, as well as discovering those departures from normal health. The private physician's office can be a lookout station. In this way he participates in a public health program and encourages preventive medicine. The pediatrician of today may be cited as an example of such a commendable practice.

Industrial hygiene in public health programs also calls for the promotion of local committees on industrial health to be created in each county medical society so that they may act in an advisory capacity to the official health agency interested or actively engaged in industrial hygiene. Since much of the problem lies in the control of the ordinary diseases of adult life, the medical society, through its members, can here again be of great assistance in early diagnosis campaigns, and so decrease the incidence and mortality for this particular group.

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U. S. Public Health Service suggests that the essential factors of an industrial hygiene program should include fundamental research, application of research and education. Most agencies are not equipped to carry on research, but can be fitted to carry out those phases of the program dealing with education and application.

It needs, though, an organized public health demonstration to bring out the amount and kind of adult health services that can be successfully offered. This is your approach to industrial hygiene.

—*Continued from Page 10*

west Indies through all of Europe to Turkey and China, the fanatics and the zealots, the doubters and the gullibles, the bombast and the meek, the scientists and the quacks, the doctors (in several specialties), the chemists and the toxicologists, the engineers and those of a mechanical turn of mind, the students of lead poisoning and the manufacturers of lead compounds, the pharmacists and compounders of their own medicines, the epidemiologists and public health workers, the logicians and the theorists, and the historians and linguists. No doubt I have overlooked a number of others, not to mention editors and publishers. Like Dr. Wong with his time-translator machine (Alley Oop, by V. T. Hamlin), the reader is thrown back 175 to 200 years to a close-up movie of the woes of the 'cyder' drinkers of Devonshire in Old England, where they really made tasty *cider*, and what the learned professor of that day thought about it. As a mind-rester at a time when the world is being turned inside out, I think the article merits a place, while, at the same time, bolstering knowledge and arousing admiration for qualities and resourcefulness at a period when the establishment of a conviction meant a battle royal." . . .

OUR full report of the "Institute of Industrial Medicine and Industrial Hygiene," comprising the Twenty-Sixth Annual Meeting of the AMERICAN ASSOCIATION OF INDUSTRIAL PHYSICIANS AND SURGEONS and the Second Annual Meeting of the AMERICAN INDUSTRIAL HYGIENE ASSOCIATION, at Pittsburgh last month, will apear in INDUSTRIAL MEDICINE for July. . . .

The following is from *Newsweek*, May 19, 1941: "Doctors of Preparedness: Care of United States Workers Keynotes Medical Parley. *In one year alone it (the casualty list from industry) is over four times as large as the entire casulaties among our troops on the battfields in Europe. . . . The number who are killed or disabled as the result of occupational diseases partially traceable to working conditions. . . . are even more shocking.* Although safety measures have reduced such figures since the World War, these words from Dr. H. E. Mock of the Surgeon General's office in 1917 still emphasize the importance of protection and medical care in the preparedness program. Even in normal times illnesses and injuries cost industry more than $10,000,000,000 a year and 350,000,000 days lost, enough time to build 52 battleships or 164,706 tanks. Since this year is expected to add about 4,000,000 employees to industrial payrolls, many of them novice workers who are particularly prone to disability, the 78% increase in days lost from injuries at the Brooklyn Navy Yard indicates the tremendous problem facing the medical profession.

"There are 5,000 full-time and part-time industrial doctors available for the emergency, and more than 1,000 of them met last week in Pittsburgh at a joint convention of the American Association of Industrial Physicians and Surgeons and the American Industrial Hygiene Association. Discussions centered about findings connected with workers' health and included the following reports: Regular workers often keep certain ailments a secret from plant physicians, according to Dr. A. G. Kammer of the Inland Steel Co., who revealed that, when questioned about venereal diseases, only eleven members of one group admitted infection, whereas physical examinations revealed 482 cases. Similarly, although 136 men knew they had tuberculosis, only 31 told doctors about their condition. Dr. C. H. Heninnger, psychiatry professor at the University of Pittsburgh, estimated that 2 per cent of industrial effort is lost because of errors made by mentally diseased workers. Drs. Carey P. McCord, G. C. Harrold, and S. F. Meek of Detroit used rabbits to test the effects of gases resulting from electric arc welding and found that the animals showed a lessened growth rate."

HERE'S what *J. A. M. A.* (June, 7, 1941) has to say about "Salt in Hot Industries:" "The amount of sweat excreted by workers in hot industries is known to be prodigious, at times amounting to several pints an hour. Consumption of water alone to replace abnormal loss of body fluids leads to the condition commonly referred to by miners and furnace workers as 'water poisoning.' Present day knowledge of water and metabolite balance has demonstrated that the symptoms of heat cramp or heat exhaustion are not the result of overconsumption of water but rather the serious depletion of chlorides. Normally, a man needs a daily intake of from 8 to 15 gm. of salt to make up for chlorides eliminated in the urine and sweat. In case of excessive perspiration, considerably larger amounts of salt are required to maintain proper balance. The practice of supplying industrial workers with salt, therefore, in hot industries and in hot weather rests on sound physiologic principles. Close observation by many industrial physicians indicates that harmful resuits need not be expected in otherwise healthy men if there is rough approximation between salt loss and salt replacement. Many industries because of convenience provide salt tablets by dispenser to be taken by the worker with each drink of water. Dextrose is frequently incorporated in the tablet on the assumption that a quick energy source is provided and that it is of value in combating shock associated with heat exhaustion. Actually, blood sugar levels in hot industry workers are not found to be measurably altered."

JAMES LINCOLN McCARTNEY, S.B., M.D., F.A.C.P., has joined the staff of William R. Warner & Company, Inc., pharmaceutical manufacturers, as Medical Director. A graduate from the University of Chichago and Rush Medical College, Dr. McCartney taught at the University of Chicago, and the Peking Union Medical College in China for the Rockefeller Foundation. There followed staff work for the Federal Hospital for Nervous and Mental Diseases (St. Elizabeth Hospital) in Washington, D. C., a Fellowship in Psychiatry at the Institute for Child Guidance in New York City, and a Directorship with the Bureau for Mental Hygiene, Connecticut State Department of Health, among other institutional work. Several years were devoted to private practice. Dr. McCartney is a Fellow of the American College of Physicians, American Psychiatric Association, and A.M.A. He is a Lieutenant Commander in the United States Naval Reserves. He served in the army during the World War. . . .

VITEX LABORATORIES, INC., Harrison, New Jersey, have prepared a pamphlet entitled "Milk in Industry," which is a summary of evidence regarding non-occupational illness as it may be related to poor nutrition. This emphasizes the improved efficiency, increased productivity and reduced absenteeism available through more healthful working conditions, particularly as the latter are enhanced by better nutrition. All in terms, quotations, and charts familiar to physicians in industry; designed for distribution to management; and so well worked out as to be both informative and convincing, along the line that the "pause that refreshes" might well include a glass of milk. Copies are available for any physician who may need persuasive assistance in conferences with management regarding fatigue.

RARE CHEMICALS, INC., formerly of Nepera Park, N. Y., recently moved offices, laboratory and factory to a new plant established at Flemington, N. J. This concern manufactures numerous medicinal specialties, among which many readers of INDUSTRIAL MEDICINE will recognize Eucupin, with the injectionable forms of which extensive clinical research and investigation has been done in proctological and industrial surgery.

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